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OXFORD DOCTORAL COURSE IN CLINICAL PSYCHOLOGY

***THEORY OF PLANNED BEHAVIOUR,
SKIN CARE & PRESSURE SORES
FOLLOWING SPINAL CORD INJURY***

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(MA Hons.)

JULY 2002

A DISSERTATION SUBMITTED IN PART FULFILMENT OF
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ABSTRACT

Objectives: To use the theory of planned behaviour to explore factors associated with performing skin care behaviours and the occurrence of pressure sores in people with spinal cord injury.

Design: A within-group cross-sectional design was used to assess 59 people with spinal cord injury living in the community. A sample returned a repeat assessment allowing a longitudinal examination of the relationship between intention and actual behaviour.

Methods: A measure was developed in accordance with the theory of planned behaviour guidelines through interviews with people with spinal cord injury. Measures of mood and knowledge of skin-care behaviours were also included.

Results: The theory of planned behaviour components, mood and knowledge of skin-care behaviours were helpful in predicting intention, skin care behaviour and occurrence of pressure sores. Demographic and disease factors also helped to identify people at increased risk of performing less skin-care behaviour or developing a pressure sore. Overall, past behaviour and indirect perceived control and past behaviour and age were particularly important predictors of pressure relief and skin checking intention respectively.

Conclusions: Psychosocial factors, including the theory of planned behaviour components, were useful in understanding adherence to skin care behaviours and the occurrence of pressure sores. Overall the combination of past behaviour and indirect perceived control, and past behaviour and age were particularly important predictors of pressure relief intention and skin checking intention respectively. The clinical and theoretical implications of these findings are considered and suggestions for future research are outlined.

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“To God Be The Glory”.

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Section One: INTRODUCTION

This study investigates skin-care management and the development of pressure sores in people with spinal cord injury, in particular, whether components of the theory of planned behaviour and other psychological factors influence their decision to perform skin-care behaviours.

The first part of this section will discuss the area under investigation and the clinical setting. The theoretical background to this study will then be discussed with reference to the empirical literature and methodological issues involved. In the second part of this section, the rationale of the current study will be outlined and the research questions and hypotheses presented.

1.1) Area for Investigation

1.1.1) Definition

A pressure sore is a 'localised area of cellular damage resulting either from direct pressure on the skin, causing ischaemia, or from shearing or friction forces causing mechanical stress on the tissues' (Chapman & Chapman, 1986).

1.1.2) Current Situation

Pressure sores are a serious problem amongst the disabled, debilitated and chronically ill in hospitals and communities (Simpson, Bowers, Weir-Hughes, 1996). They can occur in acutely ill and immobile patients. They can seriously impact a person's life causing further disability and, if left untreated, they can cause serious health problems. Treatment involves total bed rest for significant periods of time, in severe cases up to a year or more (Johnson, Gerhart, McGray, Menconi & Whiteneck, 1998).

Depending on the severity of the pressure sore, the patient will require treatment and monitoring in hospital and in more severe cases, surgery. Pressure sores can result in amputation and fatality, through the development of infections such as septicaemia, the third underlying cause of death in people with spinal cord injuries (Krause, 1998, Yarkony & Heinemann, 1995). The incidence of pressure sores in hospital and community settings has been reported at 10% and 7% respectively (Cullum & Clark, 1992).

Pressure sores are very expensive to treat with estimated annual costs at £750 million in the United Kingdom (West & Priestley, 1994). Treatment of pressure sores has serious implications not only for hospital budgets, but also for health care staff, bed availability and other resources because patients with pressure sores can require lengthy hospital stays. Pressure sores also have significant cost for the person in terms of their quality of life. Treatment can result in absence from work, interruption to normal activities, financial difficulties and altered body image (Dowsett, 2001, Simpson et al., 1996). Given the impact of pressure sores on patient's health and quality of life as well as the NHS's limited resources, the importance of minimising the occurrence of pressure sore is paramount (Zedjlik, 1991).

1.1.3) Precipitating Factors in the Development of Pressure Sores

There are three main precipitating factors in the development of pressure sores; pressure, shearing and friction, with pressure believed to be the most important factor (Dealey, 1997). Pressure sores are most likely to occur between bony prominences and skin surfaces. When the skin is compressed between the bone and a hard surface, blood is squeezed out of the underlying tissue, causing circulation to become blocked

(Zedjlik, 1991). The skin can become red in this area but returns to normal once the pressure is removed. However, if pressure goes unnoticed, it can lead to skin inflammation, destruction of cell metabolism and necrosis of the tissue, muscle and bone and infection (Zedjlik, 1991).

1.1.4) Pressure Sore Prevalence in the Spinal Cord Injury Population

People with spinal cord injury are at increased risk of developing a pressure sore. Damage to the spinal cord can result in either total loss (a 'complete' injury) or partial loss (an 'incomplete' injury) of sensory and motor function below the level of injury. This means that whilst other people avoid pressure by constantly shifting position due to sensory stimuli, even when asleep, people with spinal cord injury do not have this sensation or only have altered sensation to warn them to shift position.

Prevalence rates of pressure sores are as high as 33% in people with spinal cord injury living in the community (Fuhrer, Garber, Rintala, Clearman & Hart, 1993, Young & Burns 1981). Other researchers examining morbidity in people with spinal cord injury over a twenty year period found that pressure sores were the most common secondary complication, with an annual incidence of 23% among people one to five years post-spinal cord injury and 30% for individuals six or more years post-spinal cord injury (Whiteneck, Charlifue, Frankel, Fraser, Gardner et al., 1992). These rates indicate that pressure sores are a significant problem amongst people with spinal cord injury living in the community and their risk may increase with time since injury.

1.1.5) Prevention of Pressure Sores

Up until the 1950's it was still commonly thought that pressure sores were an inevitable consequence in people with spinal cord injury (Guttmann, 1955). However, it is now recognised that pressure sores are preventable with proper self-care (Hibbs, 1988, Krause, 1998, Olshansky, 1994). Regular pressure relief and meticulous skin inspection are crucial preventative strategies, with twice daily skin checking recommended, each morning before getting up and each night before returning to bed (Zedjlik, 1991).

During initial rehabilitation in specialist spinal cord injury centres, people with spinal cord injuries are given information on pressure sore prevention strategies, involving skin-care management (Garber, Rintala, Rossi, Hart & Fuhrer, 1996). The importance of regular skin inspection, either with the help of a carer or independently and knowing how to address skin problems if they occur, is stressed to the person before they move back into the community (Yarkony & Heinemann, 1995). However, people with spinal cord injury living in the community still develop pressure sores.

1.2) Risk Factors Associated with Pressure Sores

1.2.1) Predisposing Risk Factors for Pressure Sores

Whilst there are three major precipitating factors in the development of pressure sores as outlined, there are a number of underlying factors thought to increase a person's vulnerability to developing pressure sores (Andrychuk, 1998). However there is little consensus about the key factors involved (Simpson et al., 1996).

1.2.2) Demographic, Disease and Lifestyle Factors and the Development of Pressure Sores

A recent review highlighted over 200 risk factors associated with pressure sores (Byrne & Salzberg 1996). There is some evidence that certain demographic factors are associated with the occurrence of pressure sores. Older age, single status, low socio-economic status and unemployment are all understood to be associated with increased risk of pressure sores (Fuhrer et al. 1993 Garber et al. 1996, Garber, Rintala, Hart & Fuhrer 2000, Ivie & DeVivo 1994, &Young & Burns 1981). Race is also believed to be a risk factor, with subtle changes in skin appearance being harder to recognise in darker skin (Leigh & Bennett 1994). Disease-related factors are also associated with pressure sores, in particular, longer duration of spinal cord injury, greater impairment, disability and less functional independence (Fuhrer et al., 1993, Garber et al., 2000, Ivie & DeVivo 1994, Vidal & Sarrias, 1991,). Yarkony & Heinemann (1995) & Salzberg, Byrne, Cayten, Kabir, van Niewerburgh, et al., (1998) found completeness of injury significantly predicted the occurrence of pressure sores. Still others have highlighted physical or lifestyle factors; alcohol and drug abuse, smoking, poor nutrition and secondary illnesses and conditions, such as urinary tract infections, arteriosclerotic heart disease and diabetes (Byrne & Salzberg, 1996, Vidal & Sarrias, 1991, Hawkins & Heinemann, 1998).

However, there are three main problems with these findings. Firstly, there are several methodological limitations, including small sample sizes, cross-sectional designs and use of several subjectively determined risk assessment scales. Also, whilst most studies focus on older people in nursing homes and provide some valuable information, risk factors are often different for the spinal cord injury population

(Byrne & Salzberg, 1996). Secondly, many of the factors mentioned have contradictory evidence, especially regarding demographic and disease factors. While some researchers say older age is associated with increased risk of pressure sores (Bergstrom & Braden, 1992), others say younger age is associated with increased risk (Young & Burns, 1981), while others deny any relationship (Fuhrer et al., 1993). Similar contradictions exist regarding the influence of gender, ethnicity, marital status and employment status (Fuhrer et al., 1993, Garber et al., 2000, Krause, 1998 & Vidal & Sarrias 1991). Other contradictory findings exist regarding level of injury. Whilst one might expect people with tetraplegia to be more susceptible to pressure sores because of increased motor impairment, Trieschmann (1988) found that tetraplegics and paraplegics showed the same incidence of pressure sores. This remains unexplained, suggesting there may be factors other than demographic or disease factors at work to influence the development of pressure sores.

Thirdly, while demographic and disease factors may arguably be useful in identifying people at risk of developing pressure sores, these are not modifiable. In order to prevent pressure sores from developing, identification of amenable risk factors will be important. These issues have led some researchers to examine psychosocial factors that may be involved in adherence to skincare behaviour regimes and the development of pressure sores. Given that pressure sores are preventable through proper self-care (Krause, 1998), in particular, through pressure relief and skin checking, focusing attention on these preventative strategies and any modifiable psychosocial factors associated with them could be important in terms of pressure sore prevention.

1.2.3) Psychosocial Factors and the Development of Pressure Sores

There has been little research into the psychosocial factors associated with skin-care management and pressures sores, compared to the demographic and disease factors mentioned previously. However, more recently researchers have made some interesting findings.

Researchers examining the influence of knowledge of skin-care behaviours in people with spinal cord injury found, contrary to expectation, that knowledge of skin-care behaviours was not associated with severity of pressure sores (Garber et al., 1996). Garber et al. (1996) suggested this was because people have knowledge of pressure sore prevention strategies but, for some reason, do not act on this knowledge. Zedjlik (1991) supports this view that people can articulate the right information but do not make a commitment to change their behaviour. Zedjlik (1991) suggests patients' attitudes towards skin-care should be examined, believing that attitudes, along with feelings and knowledge affect patient's adherence to skin-care routines.

Anderson & Andberg (1979) found patient's attitudes, in particular, responsibility for one's skin integrity, attitude to maintaining integrity of skin, life satisfaction and self-esteem were associated with fewer pressure sores. Trieschmann (1988) supports the view that acceptance of responsibility is important for adaptation to the many changes spinal cord injury entails and affects the incidence of pressure sores.

As well as these possible factors, mood is understood to be associated with increased pressure sore risk (Macleod 1988). Whilst it is recognised that depression is not an inevitable consequences of spinal cord injury, people with a spinal cord injury are at

increased risk compared to the general population, with estimated prevalence rates of between 20-30% of the spinal cord injured population (Hancock, Craig, Dickson, Chang & Martin, 1993, Judd, Stone, Webber, Brown & Burrows, 1989, Kennedy, Lowe, Grey, Short, 1995). Depression has been associated with high levels of self-neglect, such as passive or non-compliant behaviour, resulting in physical complications, including urinary tract infections and pressure sores. Herrick, Elliott & Crow (1994) suggest this is due to disengagement in performing self-care behaviours.

In contrast to the research into depression, there are few studies examining the impact of anxiety. Hancock, Craig & Dickson (1994) report that up to 30% of people with spinal cord injury have raised levels of anxiety. Richards, Kewman & Pierce (2000) suggest, one would expect people to be somewhat anxious about the various changes brought about by their spinal cord injury and entering the community post-injury.

Rodriguez & Garber (1994) later employed the health belief model (Becker, Haefner & Maiman (1977) to examine the role of attitudes. They found no differences between those who developed pressure sores and those who did not, with regard to beliefs about risk, severity of pressure sores or the perceived importance of skin-care protection. Rodriguez & Garber (1994) concluded there was a discrepancy between attitudes towards pressure sores and the practice of skin-care behaviours, suggesting attitudes alone are insufficient to explain adherence to skin-care regimes.

Given that knowledge and attitudes appear to play some role in the development of pressures sores, but do not distinguish those who develop pressure sores from those who do not, other psychosocial factors may be influential. It could be important that

whilst Rodriguez & Garber (1994) considered attitudes about risk, severity and importance of skin care-protection, they did not consider the individual's sense of control or ability to perform the skin-care management strategies. Nor did they consider the influence of significant others on the person's behaviour (Graham, 1997). These two factors along with attitudes have been found to influence people's adherence to various health behaviours and are embodied in the theory of planned behaviour, which will be discussed below.

1.3) The Theory of Planned Behaviour

1.3.1) Description

The theory of planned behaviour (Ajzen, 1985, 1988, 1991) is a theory of decision-making about behaviour. It is an extension of the theory of reasoned action (Fishbein & Ajzen, 1975) and takes into account behaviours that are not under complete volitional control i.e. more complex behaviours that require, resources or opportunities that are not freely available (Ajzen, 1991). Figure 1 depicts a diagram of the theory of planned behaviour (Conner & Sparks, 1996).

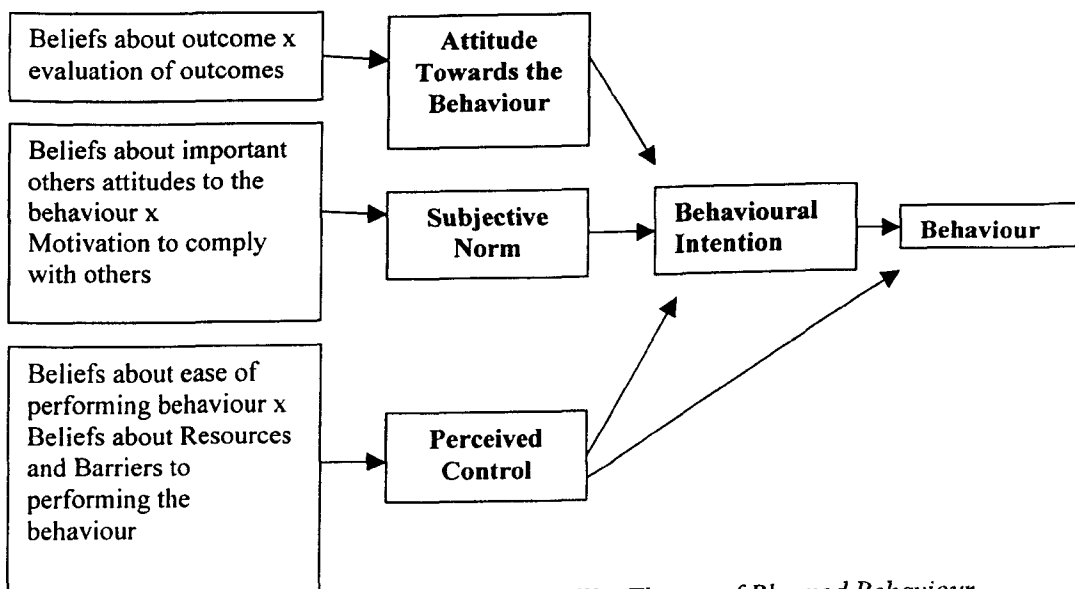


Figure 1: The Theory of Planned Behaviour

As with the theory of reasoned action, the theory of planned behaviour suggests the central determinant of behaviour is one's intention to perform the particular behaviour (Conner & Sparks, 1996). It seeks to predict individual intentions, based on a combination of three influencing factors; the individual's *attitude*, *subjective norm* and *perceived behavioural control*.

An individual's *attitude* towards a given behaviour is based on their belief that the behaviour will lead to a desired outcome and their evaluation of that outcome. These beliefs are referred to as *behavioural beliefs*.

Subjective Norm is based on the individual's perception of the social norm or pressures to perform the behaviour and their desire to comply with this norm. The perceptions about significant others' preferences regarding whether or not they should perform the behaviour are referred to as *normative beliefs*.

Perceived Behavioural Control (PBC) refers to the individual's perception of the ease or difficulty of performing the behaviour. This consists of one's perceived access to the necessary resources and opportunities to perform the behaviour successfully, weighted by the power of each factor (Ajzen, 1988). Beliefs about factors perceived to facilitate and inhibit the behaviour are referred to as *control* beliefs and may be based in part on past experience (Ajzen, 1991). These are either internal factors (e.g. individual differences, information, skills, abilities, and willpower) or external factors (e.g. time, opportunity, and dependence on others, Ajzen, 1985). To the extent that perceived behavioural control is realistic, it is viewed as a measure of actual control. Perceived behavioural control is understood to have both direct effects on behaviour

alongside or independent of intention, or an indirect effect through intention (Ajzen, 1985, Conner & Sparks, 1996).

The behavioural beliefs, normative beliefs and control beliefs comprise the most salient beliefs. They are *specific indirect* measures understood to be the antecedents to the *global direct* measures of these three variables. The model suggests the person with a strong intention to perform the behaviour is likely to have a strong belief that the behaviour can bring about desired consequences (attitude), will have people important to them who approve of the behaviour and a strong desire to desire to comply with their opinion (subjective norm) and will have perceived resources (perceived control) to perform the behaviour. The relative importance of these three determinants is expected to vary across situations and behaviours, such that sometimes one component may be the most important predictor of intentions, or a combination of the components, or all three contribute independently to the prediction of intentions (Ajzen, 1991).

The theory of planned behaviour is considered to be a useful model with which to examine skin-care behaviour for the prevention of pressure sores because it is a clear and comprehensive measure of decision-making. The theory of planned behaviour has also been applied widely, in particular to health behaviours, with a good degree of success. The theory in its current form is also open to further elaboration if other relevant determinants are identified (Ajzen, 1991).

1.4) Empirical Basis for the Theory of Planned Behaviour

As mentioned above, the theory of planned behaviour has been widely applied to various behaviours. Ajzen (1991) conducted a review of 16 studies, considering a range of behaviours, from searching for a job, losing weight, problem drinking and using condoms and found the theory received good empirical support.

1.4.1) Prediction of Intentions

When predicting intention, Ajzen (1991) found attitudes, subjective norm, and perceived behavioural control explained the variance in intention to varying degrees and collectively explained 71% of it. Perceived behavioural control contributed significantly to the prediction of intentions in every study. Attitudes also contributed significantly in many studies, but subjective norm received mixed results. This suggested that personal views were considered more important than the views of others or more general social pressures.

More recently, studies have supported the contribution of all three components in predicting intention to eat fruit and vegetables, visiting a public drinking place (Povey, Conner, Sparks, James & Shepherd, 2000, Traeen & Nordlund, 1993). Giles & Cairns (1995) found that the model predicted 61% of the variance of students' intentions to donate blood, with perceived behavioural control having the most significant impact, accounting for 61% of the variance.

1.4.2) Prediction of Behaviour

In Ajzen's (1991) review, intentions and perceived behavioural control both made significant contributions to the prediction of behaviour, with intentions being the

stronger predictor in many studies. Later studies support this finding for example, in relation to eating fruit and vegetables and eating a low fat diet (Povey et al., 2000, Armitage & Conner 1999). However, a recent review found perceived behavioural control to have a stronger direct impact on actual behaviour than intentions (Arbitrage & Conner, 2001), for example, in relation to exercising and smoking (Godin, Valois, LePage, & Desharnais, 1992, Terry & O'Leary, 1995).

Overall the theory of planned behaviour has been successfully applied to several behaviours, in particular health behaviours, in a wide range of settings. However, the theory of planned behaviour has not yet been employed to examine the predictive role of attitudes, subjective norms, perceived behavioural control in predicting skin-care behaviours and the occurrence of pressure sores.

1.5) Methodological Issues

There are several methodological issues raised in the theory of planned behaviour literature, which warrant discussion.

1.5.1) Principle of Compatibility and scale correspondence

Firstly, Fishbein & Ajzen (1975) state that when applying the theory of planned behaviour, the 'principle of compatibility' should be adhered to. This principle is based upon the assertion that scales measuring the components of the theory should comprise the four elements of action, target, context and time and each be measured at the same level of specificity. This specification allows for more accurate predictions of the behaviour (Conner & Sparks 1996). However, several studies do not adhere to this principle (Courneya, 1994).

A further issue relates to measuring repeated behaviours. Courneya & McAuley (1993) stress there is a lack of scale correspondence, especially when measuring intention and repeated behaviours. By nature, a repeated behaviour can be of varying frequency and duration, thereby making it difficult to measure accurately. Courneya (1994) suggest using continuous response formats for each behaviour, which subsequently require each component of the theory to be measured for each behavioural option. Alternatively, one can dichotomise the behaviour e.g. with responses as 'yes/no' or in a scale ranging from 'definitely did not 1 2 3 4 5 6 7 definitely did'. The latter approach offers the best scale correspondence within the theory of planned behaviour framework (Ajzen & Fishbein, 1980).

Another important issue is how to measure more complex behaviours comprising more than one component, because measuring a behavioural category as a unit is unlikely to give an adequate measure of the behaviour in question (Ajzen & Fishbein, 1980). Instead, it should be broken down into single action component. For example, rather than measuring 'healthy eating' behaviour as a whole unit, it will be more predictive to measure single components separately, such as fruit and vegetable intake and reducing chocolate intake.

1.5.2) The sufficiency of the model

Several studies have included additional factors when examining the role of the theory of planned behaviour in predicting intentions and behaviour. Past behaviour has been found to play an important role in predicting intentions and exercise behaviour and dieting (Norman & Smith 1995, Bozionelos & Bennett 1999).

Ajzen (1991) argues that past behaviour is the best measure of future behaviour when measuring behaviours under volitional control. However, for non-volitional behaviours, other factors can influence behaviour. Therefore if a model has all the factors involved, measuring past behaviour should not significantly add to the prediction of future behaviour (Ajzen & Madden, 1986).

1.6) Summary and Rationale of the Current Study

Pressure sores are a major cause of concern amongst people with spinal cord injuries and related treatment services. Whilst pressure sores are largely preventable and people with spinal cord injury are given information on preventative skin-care strategies during in-patient rehabilitation, many develop pressure sores in the community.

Various risk factors may be involved in this, but much of the evidence is contradictory, making it difficult to draw firm conclusions. Several unmodifiable factors, such as age, gender and completeness of injury, help to identify people who may be at risk, but do not actively help to reduce the person's risk of developing pressure sores. For this reason some researchers have begun to examine psychosocial factors that may be associated with skin-care management and the development of pressure sores. Previous research suggests a person's attitudes play a role as well as one's perceived ability and resources to carry out the behaviour. This study aims to examine what psychosocial factors may be associated with performing skin-care behaviours and the occurrence of pressure sores and investigates the role of demographic and disease factors.

The theory of planned behaviour may be able to explain and predict some of the psychological factors involved in whether or not a person performs skin-care behaviour, in particular, pressure relief and skin checking. This model has previously been shown to significantly predict various behaviours, including health behaviours. It has not yet been applied to skin-care behaviours, making this study a unique contribution to this area of research. Based on previous applications of this model, one would expect that each of the theory of planned behaviour components would be important. In particular, a person's perceived behavioural control and intentions to perform skin-care behaviours will strongly predict their behaviour and subjective norms may also play a role.

Most studies involving the theory of planned behaviour have not included a measure of actual behaviour, based on the premise that intention to perform behaviour is thought to be a close reflection of actual behaviour. However, this study sought to improve on previous studies by including a measure of actual behaviour. In light of recent evidence for its predictive role in intentions and health behaviours, past behaviour will also be explored.

In addition, this study seeks to examine the role of depression in relation to skin-care management and pressure sores. In so doing it may be possible to replicate the positive relationship between depression and occurrence of pressure sores found elsewhere and explore the role of depression in performance of skin-care behaviours. This examination of mood will also involve an exploration of the role of anxiety, which has not been considered previously in relation to skin-care behaviours and

occurrence of pressure sores. The role of knowledge of skin-care behaviours will also be explored.

The overall aim of this study is to explore and identify psychosocial factors associated with performing skin-care behaviours and occurrence of pressure sores, with the hope that these findings will have significant implications for education and skills training packages offered to people with spinal cord injury post-injury, in order to improve pressure sore prevention.

1.7) Research Questions

- 1) Do the components of the theory of planned behaviour predict intention, skin-care behaviour and occurrence of pressure sores in people with spinal cord injury?
- 2) Does mood (depression and anxiety) predict skin-care behaviour and occurrence of pressure sores?
- 3) Does knowledge of skin-care behaviour predict skin-care behaviour and occurrence of pressure sores?
- 4) Does past behaviour predict skin-care behaviour and the occurrence of pressure sores?
- 5) Do demographic factors (age, sex, and marital status) and disease factors (level of injury, completeness of injury, length of injury and amount of direct care received) predict skin-care behaviour and occurrence of pressure sores?

6) Which are the most important predictors of skin-care behaviour and occurrence of pressure sores?

1,8) Hypotheses

1.8.1) Theory of Planned Behaviour

Hypothesis 1: Intention will predict skin-care behaviour and occurrence of pressure sores.

Hypothesis 2: Perceived behavioural control will predict skin-care behaviour and occurrence of pressure sores.

Hypothesis 3: Attitudes, subjective norm and perceived behavioural control will predict intention to perform skin-care behaviour.

1.8.2) Psychological Variables

Hypothesis 4: Psychological variables (anxiety, depression and knowledge of skin-care) will predict skin-care behaviour and occurrence of pressure sores.

1.8.3) Past Behaviour

Hypothesis 5: Past Behaviour will significantly predict skin-care behaviour and occurrence of pressure sores.

1.8.4) Demographic and Disease Variables

Hypothesis 6: Demographic and disease factors will predict skin-care behaviour and occurrence of pressure sores.

1.8.5) Overall

Hypothesis 7: Psychosocial Factors (theory of planned behaviour, Past behaviour Anxiety, Depression and Knowledge of skin-care behaviours) will predict variance in intentions, skin-care behaviour and occurrence of pressure sores, over and above demographic and disease variables.

Section Two: METHOD

This section outlines how the study was carried out. The design, participant criteria and recruitment process are outlined, along with the measures used and the procedure used to develop the theory of planned behaviour questionnaire. The procedure for the pilot study, main study and re-test are explained, along with the ethical considerations for the study.

2.1) Design

A within-group cross-sectional survey was employed. Independent variables included demographic factors (age, sex, marital status), disease factors (severity of injury, time since injury, amount of care received), knowledge of skin-care management and psychosocial factors (theory of planned behaviour and mood).

A measure was developed specifically for this study based on the theory of planned behaviour. Two additional measures were employed; the Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983) and the Skin Management Needs Assessment Checklist (SMnac) (Berry & Kennedy, in press).

2.1) Participants

All participants were patients of the National Spinal Cord Injury Centre (NSIC), who were living in the community. People were included who had a spinal cord injury with a traumatic onset, were between 1-10 years post-injury, aged between 16-65 years and were fluent English speakers (as the measures were not validated for other

languages). People were excluded who had a known significant head injury or communication disorder. The total population of NSIC outpatients with traumatic onset between 1-10 years post-injury was 1120. Overall, 278 people were contacted to participate in the study (25% of the population) and 92 agreed to participate (8% of the population). Participants included in one phase of the study were not included in any other phase.

Participants for the pilot and main study were recruited by sequentially inspecting the patient records to meet the inclusion criteria and liaison with their Medical Consultant to ensure suitability for the study according to the inclusion criteria. Participants were sent a letter explaining the purpose and procedure of the study and a questionnaire to complete if they were willing to do so.

2.2) Measures

2.3.1) Development of Questionnaire based on the Theory of Planned Behaviour

A questionnaire was developed to assess factors involved in a spinal cord injured person's decision to check their skin or do pressure relief to prevent the development of pressure sores, based on the theory of planned behaviour. The development of the questionnaire is outlined in section 2.4. The two additional measures are discussed below.

2.3.2) Hospital Anxiety and Depression Scale (HADS) (Appendix 1)

The HADS is a 14-item scale used to measure anxiety (7 items) and depression (7 items). Each item has a choice of four responses, scored 0-3. The total score for anxiety ranges from 0-21 and the total score for depression ranges from 0-21. These

totals can be combined to obtain a total score for distress. Higher scores indicate greater anxiety and depression. Scores are classified as 'normal' (0-7), 'mild' (8-10), 'moderate' (11-14), and 'severe' (14+), with a suggested cut-off score for clinical anxiety or depression being 8 (Weinman, Wright and Johnston 1995). There is good internal consistency for the two subscales, indicated by a Cronbach's Alpha of 0.93 for anxiety and 0.90 for depression (Moorey, Greer, Watson, Gorman, Rowden, et al., 1991).

2.3.3) Skin Management Needs Assessment Checklist (SMnac) (Appendix 2)

The SMnac assesses the person's knowledge of how to perform skin checking, pressure relief and prevent skin insults, based on the individual's perception of whether they can independently undertake skin management activities (or instruct a carer to help them). It forms part of the Needs Assessment Checklist, specifically developed for the spinal cord injured population and used in in-patient rehabilitation settings to identify rehabilitation needs (Kennedy & Hamilton 1999). Each item has a choice of four responses, ranging from completely dependent to completely independent, scored 0-3 or not applicable. To obtain SMnac scales scores, raw item scores are totalled and converted to represent a skin management percentage. A low percentage score indicates low knowledge or low perceived competence of being able to care for one's skin. The SMnac has good internal consistency with a Cronbach Alpha of .85. (Berry & Kennedy, in press).

2.4) Procedure

2.4.1) Development of the Theory of Planned Behaviour Questionnaire

The protocol described by Conner & Sparks (1996) and Ajzen & Fishbein (1980) for the development of the theory of planned behaviour questionnaire was used in this study.

Definition of the behaviour

Conner & Sparks (1996) stipulate that in order to operationalise the model, a clear definition of the behaviour in question must be developed. The term 'skin-care behaviour' refers to several component parts and so it was important to clearly define this term so that all participants were answering with reference to the same behaviour. Courneya (1994) also stresses the importance of carefully assessing the components of the theory of planned behaviour in relation to each component of the behaviour in question.

Through discussion with a Medical Consultant and the Clinical Nurse Specialist at the NSIC, it was agreed the two most important components of the definition of skin care behaviour were pressure relief and skin checking.

Conner & Sparks (1996) also stipulate that when studying a repeated behaviour, such as skin-care behaviours, a specified amount of time needs to be chosen for investigation. The time specified for both pressure relief and skin checking were the advised amount specified in the patient education classes by the Clinical Nurse Specialists. The amount of pressure relief was on average for two minutes every hour and skin checking twice daily. Conner & Sparks (1996) also stipulate the behaviour in

question must be defined specifically regarding the action, target, context. The actions under question were pressure relief and skin checking, the context was community setting and the target was people with spinal cord injury living in the community.

Behavioural Intention Items

Three items were used to measure intention in this study. Conner & Sparks (1996) suggest that multiple-item measures are more appropriate from a psychometric point of view in assessing intention to perform behaviour than a single-item measure. They suggest that items assessing intentions to perform behaviour as plans, desires and self-predictions are typically highly correlated (Norman & Smith 1995). Three such items were used.

Derivation of Salient Beliefs

It was important to ascertain salient beliefs about pressure relief and skin checking relevant to this population, rather than assume what people may believe. A draft version of the questionnaire was developed using semi-structured interviews to identify salient beliefs in a representative sample of outpatients. Ajzen (1991) recommends that a minimum of six people are interviewed in order to obtain a range of salient beliefs. Therefore, twenty-five potential participants, due to attend their outpatient appointment, were contacted to ensure the minimum recommended number was obtained. Interviews were conducted according to the theory of planned behaviour guidelines in order to identify salient behavioural, normative and control beliefs (Ajzen & Fishbein, 1980).

Interviews were conducted in a quiet room in the outpatients department of the NSIC. Potential participants were contacted by letter two weeks before their appointment to request if they would like to participate. The letter contained information about the purpose of the study and the content of the interview. Those wishing to participate in the study were asked to complete and return the consent form (Appendix 3) in the stamped addressed envelope provided. It was explained that the researcher would meet with the participant when they arrived for their outpatient appointment to arrange a suitable time to be interviewed at the NSIC after their appointment.

The purpose of the interview was briefly outlined again and the interview, which lasted approximately 20 minutes, was conducted according to the theory of planned behaviour guidelines. The interview questions are outlined in Appendix 4. The interview began with general questions about level of injury, history of pressure sores and experience of pressure relief and skin checking to ascertain a common understanding of the terms used. The author then explicitly stated the specific behaviour, including the specified time scale. Questions regarding pressure relief and skin checking were then asked and responses were recorded by hand.

Of the eleven interviews completed, ten interviewees were male and one was female. This gender balance appeared representative of the spinal cord injured population (Kennedy 2001). Three interviewees had experienced one or more pressure sores, either in hospital or at home.

The most frequently reported beliefs were drawn into a shortlist of themes or 'salient beliefs' for each theory of planned behaviour component in relation to pressure relief

and skin checking (Table 1). These beliefs were also rated by another trainee clinical psychologist for each theory component. Inter-rater reliability was calculated for items derived from the 11 interviews using Cohen's Kappa, eliciting an overall agreement of 95.8%. This indicated substantial inter-rater reliability (95% confidence interval).

2.4.2) Design and Layout of the Draft Questionnaire

A draft questionnaire was developed based on the template designed by Conner & Sparks (1996) and Ajzen & Fishbein (1980). It included five sections: one involving the three components of the theory, behaviour intention and past behaviour, one involving two qualitative questions and one involving demographic information, disease information and pressure sore information.

Instructions regarding how to complete the questionnaire were given and it was highlighted that participants should complete the questions from the perspective of doing pressure relief for two minutes every hour and skin checking twice daily over the next week. Responses to all items relating to the three components of the theory were rated on a 7-point scale. The questionnaire was set out in the order of the original model as no particular order is specified by Conner & Sparks (1996), detailed below in Table 2. The behavioural intention, demographics, spinal cord injury and pressure sore section was included at the end of the questionnaire because Oppenheim (1992) suggests participants are more willing to provide personal data after having completed a questionnaire, rather than at the beginning before knowing what the questions are about.

Table 1: *Modal Salient Beliefs: Attitude, Subjective Norm and Perceived Behavioural Control for Pressure Relief and Skin Checking*

PRESSURE RELIEF		
Belief Identified	Influential others identified	Perceived Behavioural Control Belief Identified
Prevents pressure sores	Carer	Feeling self-conscious or embarrassed
Eases pain and discomfort	Family	Being busy with other things
Prevents weeks in bed waiting for sore to heal	Friends	Memory of a pressure sore or pictures of a pressure sore
Avoids stay in hospital	Friends with spinal cord injury	Feeling discomfort
Helps improve blood circulation	Myself	Asking others to help me
Causes discomfort		Feeling lazy
		Awareness of skin tolerance
		Sitting on an unfamiliar surface
		Pressure relief is automatic
SKIN CHECKING		
Belief Identified	Influential Others Identified	Perceived Behavioural Control Belief Identified
Prevents pressure sores	Carer	Access to a mirror
Catches pressure sore at the early stages	Family	Being on unfamiliar surface or in unfamiliar environment
Takes a lot of time	Friends	Having help to check my skin
	Friends with spinal cord injury	Other symptoms to alert me to check my skin
	Myself	Memory of a pressure sore or pictures of a pressure sore
		Fear of pressure sores
		Patchy sensation in limbs
		Being busy
		Being tired
		Other people's understanding of the need to check skin

This spinal cord injury and pressure sore information identified in the final section included; length of injury, number of hours of direct care received daily (from paid carers, informal carers or relatives), level of injury and completeness of injury, whether or not they have had a pressure sore since discharge from hospital, how many pressure sores since discharge, number of days bed rest because of a pressure sore, the estimated width of the pressure sore (or, if more than one, the worst pressure sore) in centimetres or inches and the estimated depth of the pressure sore, crudely defined as a 'very superficial sore', 'shallow sore' or a 'deep sore'. Two open-ended questions were also included, asking participants to list what they considered to be likely causes of a pressure sore and any other comments or information they considered useful in understanding the issue of skin care behaviour and pressure sores. There was also opportunity to opt-in to the retesting of the theory of planned behaviour measure.

The research supervisor and an expert in the theory of planned behaviour checked the face validity of the questionnaire. Minimal changes were made.

2.4.3) Design and Layout of Information Letter (Appendix 5)

The draft information letter included the rationale and aims of the study. It was explained that participation was voluntary and information provided would be confidential. Contact names and details were provided in case of enquiries.

2.4.4) Design and Layout of Instruction sheet (Appendix 6)

Instructions were provided according to the guidelines outlined by Ajzen & Fishbein (1980) and it was emphasised there were no right or wrong answers to the questions.

2.4.5) Pilot Study

A pilot study was carried out in order to test for internal reliability of the theory of planned behaviour questionnaire and floor and ceiling effects. Potential participants were sent the information sheet and the full questionnaire pack including the HADS and SMnac. Participants consented to the study by completing the questionnaire and returning it in the stamped addressed envelope provided. Based on statistical advice, sixty people were contacted to participate, in order to obtain a reasonable sample for internal reliability calculations, within the time constraints of this study, Twenty-one participants returned questionnaires (17 males and four females). The procedure was the same as for the main study.

Internal Reliability was assessed by calculating the Cronbach alpha coefficients for the theory of planned behaviour components in the questionnaire. These are presented below in Table 2.

Table 2- Cronbach Alpha coefficients for components of the theory of planned behaviour questionnaire

Components	PRESSURE RELIEF		SKIN CHECKING	
	Alpha Value	Number of Items	Alpha Value	Number of Items
Direct Attitude	.86	7	.78	7
Indirect Attitude	.73	6	.20	3
Direct Subjective Norm	.46	3	.73	3
Indirect Subjective Norm	.93	4	.87	4
Direct Perceived Behavioural Control	.70	5	.81	5
Indirect Perceived Behavioural Control	.50	11	.77	10

The alpha values ranged between .20 and .93 with a mean alpha of .70 for pressure relief and .69 for skin checking. This is approximate to the widely accepted standard internal reliability of .70 (Nunnally 1978).

It was recognised that the reliability for indirect attitude towards skin checking was problematic with a Cronbach alpha reliability of .20 and reliability for indirect perceived control for pressure relief was modest (Cohen & Halliday 1982). For indirect attitude, there was one item whose removal would have greatly increased the reliability of the subscale and for indirect perceived control there were a number of potential items for exclusion. However, given that the semi-structured interviews with participants suggested these items were salient beliefs, it was hoped that within the larger main study these items would become more integrated into the scale. Therefore no items were removed.

However, some wording amendments were made based on further examination of the following subscales.

- A ceiling effect was observed in the *Global Attitude* section, leading to a rewording of the items in both the pressure relief and skin checking sections from asking participants to rate how 'good' each of the consequences of the behaviour would be on a seven point scale ranging from 'bad to good', to asking 'how much of a priority each of the consequences are' rated on a scale 'strongly disagree – strongly agree'. This aimed to increase the variance of responses.
- One item on the *Subjective Norm* section of pressure relief 'I feel under social pressure to do pressure relief/skin checking' had low reliability. This was modified to 'I feel under pressure from people who know me to do pressure

relief/skin checking', in order to make it more specific to the spinal injured population.

The final draft of the questionnaire used for the main study is included in Appendix 7.

2.4.6) Design and Layout of Re-Test Questionnaire

The theory of planned behaviour questionnaire was used for the retest phase with the section requesting to re-contact people removed. The item enquiring about the participant's skin-care behaviour within the past week served as a measure of actual behaviour, corresponding with the initial assessment of the intention to perform behaviour.

2.4.7) Ethical Approval

Ethical approval was sought for this study and was granted for the first phase involving the interviews with participants, with the request that the draft questionnaire be submitted for approval once it was developed.

The Ethics Committee recommended minor amendments regarding the questionnaire format. These involved amending typographical errors and line spacing. With these amendments ethical approval was granted to commence the pilot and main study (Appendix 8).

Written consent was sought from each Medical Consultant in order to receive their permission to contact their patients regarding the study. Other ethical issues to be aware of were people feeling obliged to take part in the study because of being a patient at the centre, concerns about confidentiality and distress when completing the

questionnaires. These issues were addressed explicitly in the information letter sent to patients. Respondents were reminded that participation in the study was voluntary and withdrawal would not affect their treatment in any way, questionnaires would be kept in a locked cabinet to ensure complete confidentiality and would only be read by myself, or my supervisor. A contact number was also provided in case people were to experience distress when completing the questionnaires

2.4.8) Main Study

Potential participants were sent a letter informing them of the purpose and aim of the study along with a questionnaire pack to complete if they were willing to do so. 193 outpatients were sent letters and questionnaires in order to ensure a minimum sample of fifty. This sample size was chosen, based on statistical advice and previous studies exploring the theory of planned behaviour (Rollinson 2001, Flecknoe 1996), to provide an adequate sample on which to conduct multivariate statistics. Participants were requested to return the completed questionnaires in the envelope provided if they were willing to do so. A reminder letter was sent two weeks later to remind those who still wished to participate in the study, to return the questionnaire as soon as possible. 60 completed questionnaires were received.

2.4.9) Test-Re-test Phase

To assess test-retest reliability and the relationship between intention and self-reported behaviour, participants were asked to provide their name and address at the back of the questionnaire, if they were willing to be re-contacted to complete the theory of planned behaviour questionnaire once more. In total, 45 participants

(74.5%) agreed to be re-tested. A week after they completed the original questionnaire, they were sent a covering letter, the re-test questionnaire and a stamped addressed envelope in which to return the completed questionnaire.

Section Three: RESULTS

This section describes the findings of the study. Response rates, demographic and disease information are described first. This is followed by summary statistics for the questionnaires, including data relevant to psychometric properties of the theory of planned behaviour questionnaire. Finally, the results related to hypotheses- testing will be presented and some supplementary post-hoc analyses described. Before describing the findings of the study, there is a note summarising the rationale for each statistical test used.

3.1) Response Rates

3.1.1) Main Study Response Rate

In total, 193 questionnaire packs were distributed and 60 participants returned completed questionnaires, indicating a 31% response rate. This is similar to the average 33% response rate for postal surveys (Goyder, 1985). Of the 133 who did not complete the questionnaire pack, 8 questionnaire packs were returned by Royal Mail as the person no longer lived at the given address, 5 people returned the questionnaires uncompleted, reporting that they did not think the questionnaire was relevant to them because they did not need to do pressure relief and skin checking, due to good mobility and sensation. Three people were deceased and the questionnaires were returned by their families or partners. Medical Records at the NSIC were informed of this.

3.1.2) Test –Retest Response Rate

Of the 45 people who agreed to complete the retest questionnaire, 17 completed questionnaires were returned. This indicates a response rate of 28% of the main study sample.

3.2) Demographic data

Of the 60 participants in the main study, 45 were male (75%) and 15 were female (25%). The mean age of participants was 41.25 years (SD= 12.63, range 17-63 years). Of the 60 participants, 21 were single (35%), 23 were married (38.3%), 9 were divorced or separated (15%), 4 were living with their partner (6.6%), and 3 described themselves as having 'other' status (5 %).

3.2.1) Spinal Cord Injury Data

In the whole sample, the mean length of injury (i.e. the time lapsed since their spinal cord injury) was 61.93 months (SD= 29.26, range 1.5-12 years). Regarding level and completeness of injury, 13 participants had complete tetraplegia¹ (21%), 14 had incomplete tetraplegia (23%), 26 participants had complete paraplegia² (43%), and 7 had incomplete paraplegia (11.6%). Thirty-four participants (56%) reported receiving direct care from a paid carer, an informal carer, or a relative, with a mean of 6.28 hours of direct care received per day (SD=9.1, range 0.5-24).

¹ Tetraplegia refers to a spinal cord injury level ranging from C1-C7 (See Appendix 9 for diagram explaining spinal cord injury levels)

² Paraplegia refers to a spinal cord injury level ranging from T1-L5 (See Appendix 9)

3.2.2) Pressure Sore Data

Of the whole sample, 29 participants (48.3%) reported having had a pressure sore since their discharge from hospital. Of those who had a history of pressure sores since discharge, the mean number of pressure sores experienced was 3.45 (SD=4.076, range 0-20). The mean number of days bed rest as a consequence of a pressure sore was 33.44 days (SD=65.84, range 0-240 days).

The average width of pressure sore was 2.94 centimetres (SD= 1.83, range 1-8 centimetres), with 9 people experiencing a 'very superficial sore', 10 people experiencing a 'shallow sore' and 9 people experiencing a 'deep sore'.

3.3) Summary Statistics

3.3.1) Theory of Planned Behaviour Questionnaire

Before examining the data, Figure 2 offers a summary of the definitions of the components of the theory of planned behaviour.

Figure 2: Definitions of the Components of the Theory of Planned Behaviour.

Direct Attitude-	the degree to which the person has a favourable evaluation of the behaviour.
Indirect Attitude-	the degree to which the behaviour is believed to lead to a certain outcome and the perceived value of that outcome.
Direct Subjective - Norm	the perceived social pressure to perform or not perform the behaviour.
Indirect Subjective Norm-	the perceived pressure from significant others to perform the behaviour and their desire to comply with that pressure.
Direct Perceived Control-	the perceived ease or difficulty of performing the behaviour.
Indirect Perceived Control-	the perceived likelihood of facilitating and inhibiting factors occurring and their power to influence the performance of the behaviour.

Of the 60 questionnaires returned, one was excluded because of missing data, leaving 59 questionnaires available for the main statistical analysis. Summary statistics for the theory of planned behaviour scales, including means, standard deviations actual ranges and possible are provided in Table 3.

Scores were transposed for each scale so that larger scores indicated greater agreement with a higher level of the concept measured. Total scores for each scale were obtained for the direct measures by adding the individual item scores together, and for indirect measures by summing the products of the likelihood of the consequence and the power of the salient beliefs.

The descriptive statistics in Table 3 indicate that scores on the theory of planned behaviour components of attitude, subjective norm, perceived behavioural control and intention showed reasonable variance when compared to the possible range. Regarding the components related to pressure relief, participants appeared to have relatively high direct attitude and high direct perceived control, moderate indirect perceived control, direct subjective norm, indirect subjective norm and intention, and relatively low indirect attitude.

Regarding components relating to skin checking, participants appeared to have relatively high direct attitude and direct perceived control, relatively moderate indirect perceived control, direct and indirect subjective norm and intention and relatively low indirect attitude.

Table 3: Summary Statistics for Theory of Planned Behaviour Questionnaire (N=59)

Scale	Mean	Standard Deviation	Range	Possible Range
Pressure Relief				
Global Direct Attitude	38.56	7.27	28 (21-49)	42 (7-49)
Specific Indirect Attitude	221.84	60.71	245 (49-294)	576 (12-588)
Global Direct Subjective Norm	13.45	4.27	18 (3-21)	18 (3-21)
Specific Indirect Subjective Norm	106.57	48.33	172 (24-196)	192 (4-196)
Global Direct Perceived Control	27.40	7.41	24 (11-35)	30 (5-35)
Specific Indirect Perceived Control	273.98	88.23	296 (124-464)	528 (11-539)
Behavioural Intention	10.86	6.57	18 (3-21)	18 (3-21)
Skin Checking				
Global Direct Attitude	41.02	5.18	23 (26-49)	42 (7-49)
Specific Indirect Attitude	91.62	21.38	103 (20-123)	144 (3-147)
Global Direct Subjective Norm	14.2	3.75	18 (3-21)	18 (3-21)
Specific Indirect Subjective Norm	116.37	45.90	170 (26-196)	192 (4-196)
Global Direct Perceived Control	29.5	5.58	21 (14-35)	30 (5-35)
Specific Indirect Perceived Control	269.12	61.54	214 (144-358)	480 (10-490)
Behavioural Intention	12.98	5.65	18 (3-21)	18 (3-21)

3.3.2) Skin Management Needs Assessment Checklist (SMnac)

The percentage score for the SMnac was 85% (mean raw score 28.31, SD=5.07, range 12-33, possible range 11-33). This reflected a high amount of knowledge and scores appeared to have a good amount of variance, with a range comparable to the possible range. The percentage score indicated that participants fell within the 75th percentile (Berry & Kennedy's sample, in press).

3.3.3) Hospital Anxiety and Depression Scale (HADS)

The mean score for the HADS anxiety subscale was 7.24, with a standard deviation of 4.71, a range of 0-20 and a possible range of 0-21. On the anxiety subscale, 36 participants scored in the normal range (0-7), 10 in the mild range (8-10), 7 in the moderate range (11-14) and 5 in the severe range (14+) for anxiety. These scores indicated that 22 people (36%) had clinically significant anxiety (Weinman et al. 1995). There were 2 missing cases.

The mean score of the HADS depression subscale was 6.24, with a standard deviation of 4.04, a range of 1-17 and a possible range of 0-21. On the depression subscale, 38 participants scored in the normal range, 9 scored in the mild range and 8 scored in the moderate range and 3 in the severe range for depression. These scores indicated that 20 people (33%) had clinically significant depression. There were 2 missing cases.

The percentage of people in this sample who were clinically anxious or depressed, appeared to be similar to other spinal cord injured populations (Hancock et al. 1993, Craig et al. 1994, Kennedy 2000, Judd et al. 1989, & Hancock et al. 1993) and higher than the general population (6.14 for anxiety, and 3.68 for depression, Crawford, Henry, Crombie & Taylor 2001). Results of a one-sample t-test indicated that there was a significant difference between this sample and the general population for depression ($t=4.82$, $d.f.=57$, $p<01$), but not for anxiety.

3.3) Analyses Relating to the Psychometric Properties of the Theory of Planned Behaviour Questionnaire

3.4.1) Internal Reliability of the Theory of Planned Behaviour Questionnaire

In keeping with the recommendations of theory of planned behaviour researchers, a specific measure was developed for this study. The following section reports the psychometric properties of the questionnaire whereby Cronbach alpha coefficients were calculated using the 59 completed questionnaires. Three of the subscales (pressure relief-related direct perceived control and skin checking-related direct perceived control and indirect perceived control) used 30 cases, 38 cases and 25 cases respectively, because these subscales included an optional item for participants to complete if, due to their level of injury, they received help to do pressure relief, or someone checked their skin for them.

Cronbach alpha coefficients for the individual components are presented in Table 4. The mean alpha coefficient was .74 for components relating to pressure relief and .68 for components relating to skin checking. The mean alpha coefficient for the measure as a whole was .71. These are acceptable reliability scores and in line with the recommendation that alpha reliabilities should be .70 or more (Nunnally 1978).

Table 4: Cronbach Alpha coefficients for components of the Theory of Planned Behaviour.

Components	PRESSURE	RELIEF	SKIN	CHECKING
	Alpha Value	Number of Items	Alpha Value	Number of Items
Direct Attitude	.80	7	.80	7
Indirect Attitude	.80	6	.95	2
Direct Subjective Norm	.53	3	.49	3
Indirect Subjective Norm	.87	4	.85	4
Direct PBC*	.77	5	.58	5
Indirect PBC	.68	11	.45	10

*Perceived Behavioural Control

Alpha coefficients for pressure relief ranged from .53 to .87. Alpha coefficients for the components relating to skin checking ranged from .45 to .95. Initially indirect attitude for skin checking had a low reliability of .12, which was problematic. Further reliability testing indicated one item in particular with low reliability. Due to this low item reliability, the item was removed, resulting in a Cronbach's alpha coefficient of .95. It was recognised this left the scale with only two remaining items, therefore caution must be used when interpreting findings related to the indirect attitude scale for skin checking.

Overall the measure can generally be said to have acceptable internal reliability in relation to both pressure relief and skin checking. However, some caution is required when interpreting findings in view of the small sample size and some individual scales having rather low reliability.

It is of note that the direct and indirect theory of planned behaviour components were significantly correlated using Spearman's rho correlation analysis, except for the

measure of perceived control for pressure relief (for a rationale of the tests used throughout, see Foreword to Analyses on p. 43). This suggests that the belief-based basis of the model is supported in all cases except for this one measure.

3.4.2 Test-Retest Reliability

Seventeen completed retest questionnaires were returned. There was approximately a two-week interval between first completion of the questionnaire and retest completion.

A Kolmogorov-Smirnov analysis of the differences between test and retest scores indicated that the score distribution deviated significantly from normal for the majority of scales. Therefore, a Wilcoxon related samples t-test was employed to compare the means across time. There were no significant differences between groups except for one variable, skin checking-related indirect attitude ($Z=-2.37$, $p<.05$). This suggests participants' positive attitude towards skin checking may have increased over the time period, perhaps because of attention to the issue of skin care management being raised by this study.

Correlation analyses were performed to further examine the reliability of the variables across the two time points. The results are presented in Table 5 below.

Table 5: Correlation summary of the Test-Retest Data for the Theory of Planned Behaviour Variables, relating to Pressure Relief and Skin Checking

Time 1 & time 2	Direct Attitude	Indirect Attitude	Direct Subjective Norm	Indirect Subjective Norm	Direct PBC ^a	Indirect PBC	Intention
Pressure Relief	.70**±	.80**±	.70**±	.76**†	.90*±	.67*†	.68**†
Skin Checking	.71**±	.71 **±	.45 ±	.57 *†	.47 ±	.87*†	.51*†

^aPerceived Behavioural Control *.05 significance level ** .001 significance level

†Pearson's r coefficients ±Spearman's rho

All of the correlation coefficients between the theory of planned behaviour variables for pressure relief at test and retest were statistically significant, ranging from .67 to .90 ($p < .05$ significance level), indicating modest to high correlations (Cohen & Halliday 1982).

Several of the correlation coefficients for the skin checking components at test and retest were statistically significant, ranging from .51 to .87 ($p < .05$ significance level), indicating modest to high correlations across time. Indirect attitude was one of the variables to be significantly correlated over time ($r = .71$, $p < .01$). However, neither direct subjective norm nor direct perceived control were significantly correlated across time. This may be because of their relatively low internal reliability.

3.5) Hypothesis Testing

Foreword to Analyses Used

Analyses presented here were carried out using parametric and non-parametric tests. Where a correlation was carried out, a parametric test (Pearson's r product moment) was used when both variables were found to be normally distributed using a Kolmogorov Smirnov analysis. When one or more variables were not normally distributed, a non-parametric test (Spearman's Rho) was used. Two-tailed tests were used throughout. Linear regressions, the most widely used method of conducting multivariate analysis (Bryman & Cramer 1997), were used to measure the predictive role of variables in relation to intention and skin-care behaviour, where the necessary assumptions had been met, as recommended by Tabachnik & Fidell (2001). In particular, simple linear regressions were used when there was one predictor variable. Stepwise multiple linear regressions were used when there was more than one predictor variable, because this method selects the best combination of predictors accounting for the variance (Bryman & Cramer 1997). Hierarchical multiple regressions were used to test the predictive role of psychosocial variables over and above demographic and disease variables. Logistic regressions were used to test the predictive role of variables in relation to occurrence of pressure sores because the dependent variable was dichotomous.

For each hypothesis, analysis will be reported firstly in relation to pressure relief using relevant pressure relief-related variables and secondly in relation to skin checking using relevant skin checking-related variables. The summary of findings relating to each hypothesis is highlighted in shading.

3.5.1) Theory of Planned Behaviour

Assessment of Behaviour

In order to assess behaviour in the following hypotheses, participants were asked in the main study to predict their intention to perform pressure relief and skin checking behaviour over the next week. Participants in the re-test phase were then sent a questionnaire, from which the item asking about behaviour over the past week, served as the dependent variable for behaviour in these hypotheses. It should be noted that the sample size for analyses involving this dependent variables was restricted to the 17 participants who returned re-test questionnaires. For all other analyses the sample size was 59.

HYPOTHESIS 1: Intention will predict skin care behaviour and occurrence of pressure sores

To test the first part of this hypothesis involving the predictive power of intention in determining skin care behaviour a linear regression was performed, with pressure relief behaviour as the dependent variable and intention as the independent variable forced into the regression. Intention to perform pressure relief significantly predicted actual pressure relief behaviour, explaining 41% of the variance ($F=12.32$, d.f.= 1,15, $Beta=.44$, $t= 3.51$, $p<.01$).

Skin checking intention also significantly predicted skin checking behaviour, explaining 45% of the variance ($F=13.83$, d.f.= 1,15, $Beta=.60$, $t=3.71$, $p<.01$).

To test the second part of this hypothesis, involving the predictive power of behavioural intention in determining the occurrence of pressure sores, logistic regressions were performed, with occurrence of pressure sores as the dependent variable and intention to perform pressure relief and intention to perform skin checking behaviour as the independent variables, respectively. Neither of these variables significantly predicted occurrence of pressure sores.

These results partially support Hypothesis One, that intention will predict skin care behaviour, because both pressure relief intention and skin checking intention predicted pressure relief behaviour and skin checking behaviour respectively. However, intention to perform pressure relief and skin checking behaviour did not predict occurrence of pressure sores.

HYPOTHESIS 2: Perceived behavioural control will predict actual skin care behaviour and occurrence of pressure sores.

To test the first part of this hypothesis, a linear regression was performed, with pressure relief behaviour as the dependent variable and indirect and direct perceived control relating to pressure relief entered as the independent variables. Neither variable significantly predicted pressure relief intention. When the linear regression was repeated entering the equivalent skin checking variables, neither variable predicted skin checking behaviour.

To test the second part of the hypothesis, two logistic regressions were performed with occurrence of pressure sores as the dependent variable and direct and indirect

perceived control for pressure relief and skin checking as the independent variables respectively. Neither of these variables significantly predicted occurrence of pressure sores.

These results do not support Hypothesis Two because perceived control did not predict pressure relief, skin checking behaviour or the occurrence of pressure sores. One possibility is that this may partly be due to the relatively low reliability of pressure relief related indirect perceived control and skin checking related direct and indirect perceived control. This will be further addressed in the Discussion.

HYPOTHESIS 3: Attitudes, subjective norm and perceived behavioural control will predict intention to perform skin care behaviour

Hypothesis 3 was tested using a stepwise multiple linear regression with pressure relief intention as the dependent variable and attitude, subjective norm and perceived control relating to pressure relief as the independent variables. Indirect attitude was the only significant predictor of pressure relief intention, accounting for 34% of the variance ($F=11.31^{**}$, where $^{**}=p<.01$, d.f.= 1,19, $Beta=.06$, $t=3.36$, $p<.01$).

In addition to this finding, a correlation summary is available in Table 6, to provide supplementary information. The correlation analysis between the theory of planned behaviour components and pressure relief intention indicates that several factors were significantly positively associated with pressure relief intention; direct attitude, direct subjective norm, indirect subjective norm and indirect perceived control. However,

these variables were not selected for the stepwise regression model, indicating that when combined with indirect attitude, they did not predict any additional variance in outcome.

Table 6: Hypothesis 3: Correlation Analyses of Pressure Relief-related Theory of Planned Behaviour components relating to Pressure Relief Intention

	Direct Attitude	Indirect Attitude	Direct Subjective Norm	Indirect Subjective Norm	Direct PBC ^a	Indirect PBC
Pressure Relief Intention	.56**	.38*	.28*	.31*	.24	.54**

^aPerceived Behavioural Control *.05% significance level ** .001 significance level

A stepwise multiple linear regression was then performed with skin checking intention as the dependent variable and attitude, subjective norm and perceived control skin checking components as the independent variables. Indirect subjective norm was found to significantly predict skin checking intention, accounting for 24% of the variance ($F=7.78^*$, where $^*=p<.05$, d.f. = 1,21, $Beta=.05$, $t=3.42$, $p<.01$).

Table 7 provides a correlation summary for additional information. The correlation analysis between the theory of planned behaviour components and skin checking intention indicates, as with pressure relief variables, that several factors were significantly positively associated with skin checking intention; direct attitude, indirect attitude, indirect subjective norm and indirect perceived control. However, these variables were not entered into the stepwise regression indicating that when combined with indirect subjective norm, they did not predict any additional variance in skin checking intention.

Table 7: Hypothesis 3: Correlation Analyses of Skin Checking-related Theory of Planned Behaviour components relating to Skin Checking Intention

	Direct Attitude	Indirect Attitude	Direct Subjective Norm	Indirect Subjective Norm	Direct PBC ^a	Indirect PBC
Skin Checking Intention	.41**	.30*	.09	.41**	.08	.52**

^a Perceived Behavioural Control *.05% significance level ** .001 significance level

These results provide some support for Hypothesis 3 because indirect attitude predicted pressure relief intention and indirect subjective norm predicted skin checking intention.

3.5.2) Psychosocial Factors, Past Behaviour and Demographic and Disease Variables

HYPOTHESIS 4: Psychological variables (anxiety, depression and knowledge of skin care) will predict skin care behaviour and occurrence of pressure sores.

Two stepwise multiple linear regressions were performed with pressure relief behaviour as the dependent variable in the first regression and skin checking behaviour in the second regression and anxiety, depression and knowledge as the independent variables. None of the independent variables significantly predicted pressure relief or skin checking behaviour.

A logistic regression was performed with occurrence of pressure sores as the dependent variable (where 1= occurrence of pressure sore and 2= no occurrence of pressure sores) and anxiety, depression and knowledge entered as the independent variables. Anxiety, depression and knowledge of skin care behaviour all significantly predicted occurrence of pressure sores. The chi-square statistic indicated that this model was significant ($\chi^2=13.93$, $p<.01$) and the model correctly predicted 69.6% of the cases. As Table 8 indicates anxiety (Beta=.25, $p<.05$) , depression (Beta=-.23, $p<.05$) and knowledge of skin care behaviour (Beta=.16, $p.02$) all significantly predicted occurrence of pressure sores. Given the way in which the variable relating to occurrence of pressure sores was scored, these findings indicate that increased anxiety and knowledge about skin care behaviour were associated with less likelihood of developing a pressure sore and increased depression was associated with increased likelihood of developing a pressure sore.

Table 8: Hypothesis 4: Logistic Regression Summary for Psychological Factors and the Occurrence of Pressure Sores

	B	S.E	Wald	d.f.	Significance
Anxiety	.25	.09	6.685	1	.01
Depression	-.23	.10	4.16	1	.03
SMNAC ^a	.16	.07	5.16	1	.02

^a Skin Management Needs Assessment Checklist

Supplementary analysis was performed to examine the relationship between knowledge and occurrence of pressure sores further. A Mann-Whitney test, comparing participants with a history of a pressure sore(s) since discharge from

hospital with participants without pressure sores since discharge, indicated that people with no history of pressure sores since discharge had significantly more knowledge of skin care behaviour than those who had a history of pressure sores ($U=244.50$, $p<.01$). Further correlation analysis indicated that knowledge of skin care behaviour was significantly negatively correlated with number of pressure sores since discharge ($r=-.38$, $p<.01$). These two findings suggest that having knowledge of skin care behaviour is associated with not developing pressure sores and the more knowledge people have, the fewer pressure sores they have.

Supplementary analysis was also performed to examine the relationship between anxiety, depression and occurrence of pressure sores, using Mann-Whitney independent samples tests. No significant differences were found in anxiety or depression between those who had a pressure sore since discharge and those who did not. This will be further addressed in the Discussion.

These results partially support Hypothesis Four, that psychological variables will predict skin-care behaviour and occurrence of pressure sores, because anxiety, depression and knowledge did not predict skin-care behaviour, but knowledge was found to negatively predict occurrence of pressure sores.

HYPOTHESIS 5: Past Behaviour will significantly predict skin care behaviour and occurrence of pressure sores.

Two linear regressions were performed to test the role of past behaviour in predicting skin-care behaviour, with pressure relief behaviour as the dependent variable in the

first regression and skin checking behaviour as the dependent variable in the second regression and past pressure relief behaviour and past skin checking behaviour entered as the independent variables respectively.

Past behaviour was found to significantly predict pressure relief behaviour, accounting for 44% of the variance ($F=13.30^{**}$, d.f.= 1, 15, $Beta=.72$, $t= 3.65$, $p<.01$).

Past behaviour was also found to significantly predict skin checking behaviour, accounting for 64% of the variance ($F=27.44^{**}$, d.f.= 1,14, $Beta=.89$, $t=5.24$, $p<.01$).

To test the second part of this hypothesis, a logistic regression was performed, with occurrence of pressure sores as the dependent variable and past pressure relief and past skin checking behaviour as the independent variables. Neither of these variables significantly predicted occurrence of pressure sores.

These findings partially support Hypothesis 5 because past behaviour significantly predicted skin-care behaviour, but did not predict occurrence of pressure sores.

HYPOTHESIS 6: Demographic and disease factors will predict skin care behaviour and occurrence of pressure sores.

Two stepwise multiple linear regressions were performed with pressure relief behaviour as the dependent variable in the first regression and skin checking behaviour in the second regression and age, gender, status, length of injury, level of injury (paraplegia/tetraplegia), completeness of injury, and hours of direct care

received daily as the independent variables. Level of injury i.e. whether a participant was paraplegic or tetraplegic, significantly predicted pressure relief behaviour, accounting for 28.3% of the variance ($F=7.32^*$, d.f.= 1,15, $t=2.70$, $p<.05$). Further analysis of this relationship, using a Mann-Whitney test, indicated that paraplegics performed significantly more pressure relief behaviour than tetraplegics ($U=12.50$, $p<.05$).

Number of hours of direct care received daily was found to significantly predict skin checking behaviour, accounting for 30.2% of the variance ($F=7.91^*$, d.f.=1,15, $Beta=.25$, $t=2.81$, $p<.05$). Further analysis using a Mann-Whitney test indicated that participants who received more hours direct care daily reported significantly more skin checking behaviour ($U=14.5$, $p<.05$). This may be because their carer is encouraging them to check their skin or is checking their skin for them.

A logistic regression was performed to test the second part of the hypothesis, involving the predictive power of demographic variables on the occurrence of pressure sores, with occurrence of pressure sores entered as the dependent variable (where occurrence of pressure sores =1 and no occurrence of pressure sores =2) and age, gender, status, length of injury, level of injury (paraplegia/tetraplegia) (where tetraplegia =1 and paraplegia =2), completeness of injury (where complete =1, incomplete =2), and hours of direct care received daily as the independent variables. This model was found to be significant ($\chi^2=17.60$, d.f.=7, $p<.05$) and the model correctly predicted 67.8% of the cases. One variable, completeness of injury, significantly predicted occurrence of pressure sores (Wald= 6.78, $Beta=2.57$, Standard Error=.98, $Exp(B)=13.15$, $p<.01$). The $Exp(B)$ value indicated that participants with

complete injuries were thirteen times more likely than participants with incomplete injuries to have developed a pressure sore since discharge.

In order to examine further the differences in the occurrence of pressure sores according to completeness of injury, chi square analyses were performed. These indicated that there was a significant difference in the likelihood of having had a pressure sore as a function of completeness of injury ($\chi^2=5.05$, $p<.05$) and participants with a complete injury were significantly more likely to have had a pressure sore than participants with an incomplete injury ($\chi^2=9.96$, $p<.01$).

These findings support Hypothesis 6 that demographic and disease variables will predict skin care behaviour, because level of injury significantly predicted pressure relief behaviour, hours of direct care received daily significantly predicted skin checking behaviour and completeness of injury significantly predicted occurrence of pressure sores.

3.5.3) All Variables

HYPOTHESIS 7: Psychosocial Factors (Theory of Planned Behaviour, Past Behaviour, Anxiety, Depression and Knowledge of Skin care) will predict variance in intentions, skin care behaviour and occurrence of pressure sores, over and above demographic and disease variables.

In order to test the first part of this hypothesis, a hierarchical multiple regression was performed with pressure relief intention as the dependent variable. Demographic and disease variables (age, gender, status, length of injury, level of injury, completeness of injury, and hours of direct care received daily) were entered in the first block as independent variables and psychosocial variables (pressure relief-related theory of planned behaviour components, past behaviour, anxiety, depression and knowledge) were entered stepwise into the second block as independent variables. Demographic and disease factors did not significantly predict pressure relief intention. However, the results presented in Table 9 indicate that past behaviour and indirect perceived control were found to significantly predict pressure relief intention, accounting for 61.2% of the variance ($F=4.50^*$, $d.f.=9,11$).

Table 9: Hypothesis 7: Hierarchical Multiple Regression for Pressure Relief Intention.

	Adjusted R^2	F	B	df	t	Significance
Past Behaviour	.65	2.85	.72	8,12	2.75	.019
Indirect PBC ^a	.79	4.50	.0004	9,11	2.60	.025

^a Indirect Perceived Control

The method described above was repeated, this time employing relevant skin checking variables. The Adjusted R^2 statistics indicated that age and past behaviour significantly predicted skin checking intention, explaining 78.8% of the variance (Table 10). Age significantly negatively predicted 52.2% of the variance in skin checking intention.

Table 10: Hypothesis 7: Hierarchical Multiple Regression Summary for Skin Checking Intention

	Adjusted R ²	F	B	d.f.	t	Significance
Age	.52	4.27*	-.135	7,14	-3.98	.002
Past Behaviour	.788	10.77**	.58	8,13	4.31	.001

*.05% significance level **.001 significance level

Supplementary analysis was performed to further examine the relationship between age and skin checking intention. Spearman's rho correlation analysis indicated that there was no significant relationship between age and skin checking intention.

In order to test the second part of the hypothesis, involving the predictive power of psychosocial factors in determining skin care behaviour, two hierarchical multiple regressions were attempted with pressure relief behaviour and skin checking behaviour as the dependent variables respectively. However, neither of these regressions met the assumptions because their residuals were not normally distributed.

In order to test the final part of this hypothesis, involving the predictive power of the psychosocial variables, over and above demographic and disease variables, to predict occurrence of pressure sores, two hierarchical logistic regressions were conducted. The first hierarchical logistic regression involved the occurrence of pressures sores as the dependent variable and demographic and disease variables entered as block 1, and Forward Stepwise variable selection was used in block 2 for psychosocial variables, with removal testing based on the probability of the Wald Statistic. Whilst the model was found to be significant ($\chi^2=26.73$, $p<.01$) and predicted 81% of the cases, all of the standard errors were high and none of the Wald statistics were significant. These

findings suggested a multicollinearity problem, for which no specific test exists in logistic regression (Menard 1995).

When this procedure was repeated with the relevant psychosocial variables relating to skin checking, the chi-squared statistic indicated that this model was not significant.

These findings partially support Hypothesis 7 because past behaviour and indirect perceived control significantly predicted pressure relief intention over and above demographic and disease variables, and past behaviour significantly added to the variance in skin checking intention significant predicted by age.

3.6) *Supplementary Analyses*

3.6.1) *Demographic and Disease Variables*

In order to test for any significant differences in scores in the dependent variables pressure relief intention, skin checking intention, pressure relief behaviour and skin checking behaviour, Mann-Whitney analyses were performed and Kruskal Wallis Tests in the case of marital status. These results found no significant differences as a function of age, gender, marital status, level of injury and length of injury.

When completeness of injury was tested in this way, participants with complete injury appeared to have significantly more hours direct care per day ($U=255$, $p<.05$), participants with complete injuries reported significantly more skin checking behaviour ($U=3.00$, $p<.05$). Further analysis indicated that participants with complete injuries reported significantly more pressure sores since discharge ($U=291.50$, $p<.05$).

3.6.2) Theory of Planned Behaviour Variables

Further correlation analysis examined the relationship between theory of planned behaviour variables and indirect attitude, which had significantly predicted pressure relief intention (Hypothesis 3). A number of significant correlations were found, which are presented in Table 11; direct attitude, direct subjective norm, indirect subjective norm and indirect perceived control. This suggests that as indirect attitude increases, these other components also increase.

Table 11: Correlation Analyses of Pressure Relief-related Theory of Planned Behaviour Components and Indirect Attitude

	Direct Attitude	Direct Subjective Norm	Indirect Subjective Norm	Direct PBC ^a	Indirect PBC
Indirect Attitude	.57**	.28*	.44**	.34	.38**

^a Perceived Behavioural Control *.05% significance level **.001 significance level

For skin checking variables, a number of components were also significantly positively correlated with indirect subjective norm, which had significantly predicted skin checking intention (Hypothesis 3), which are presented in Table 12; direct attitude, indirect attitude, direct subjective norm and indirect perceived control. This indicates that as indirect subjective norm increases, these variables tend to increase.

Table 12: Correlation Analyses of Skin Checking-related Theory of Planned Behaviour Components and Indirect Subjective Norm.

	Direct Attitude	Indirect Attitude	Direct Subjective Norm	Direct PBC ^a	Indirect PBC
Indirect Subjective Norm	.53**	.35**	.43**	.19	.46**

^a Perceived Behavioural Control *.05% significance level **.001 significance level

Indirect Subjective Norm

In order to further explore the relationship between indirect subjective norm and skin checking intention (Hypothesis 3), Spearman's rho correlations were performed between skin checking intention and the individual items of the indirect subjective norm variable. The results are presented in Table 13. These findings indicate that family, friends with spinal cord injury and spinal cord injury staff are all people who would approve of skin checking behaviour and with whose opinion the participants want to comply.

Table 13: Correlations between Skin Checking Indirect Subjective Norm items and Skin Checking Intention

	Family	Friends	Friends with spinal cord injury	Spinal Cord Injury Centre Staff
Skin checking intention	.31*	.23	.46*	.38*

**.05% significance level*

Indirect Perceived Control for Pressure Relief

This same method was used to explore further the relationship between pressure relief intention and indirect perceived control for pressure relief (Hypothesis 7). The significant results, presented in Table 14, indicate that several items were significantly correlated with pressure relief intention. Having knowledge of how to do pressure relief, remembering the photos that were shown in hospital as part of the patient education classes, knowing one's skin tolerance, remembering a past pressure sore, sitting on an unfamiliar surface and pressure relief being a habit are all modestly correlated with pressure relief intention.

Table 14: Correlations between Pressure Relief Indirect Perceived Control and Pressure Relief Intention

	Knowledge ^a	Photos ^a	Knowing skin tolerance	Remembering a past pressure sore	Sitting on an unfamiliar surface	Pressure relief being a habit
Pressure Relief Intention	.55**	.43**	.40**	.33*	.28*	.62**

*.05% significance level ** .001 significance level ^aHaving knowledge of how to do pressure relief

^bRemembering photographs of pressure sores shown in hospital

3.7) Qualitative Data

Self-Report of the Likely Causes of Pressure Sores

Of the 60 people who returned completed questionnaires, participants with a history of a pressure sore since discharge were asked what they considered to have been the likely causes of this. Twenty-five participants made comments, which were summarised by developing the following categories. For each category, the number of comments made is included; not doing enough pressure relief (5), having poor positioning or not changing position in bed (5), equipment did not suit properly (cushion, wheelchair) (3), other symptoms (an infection, psoriasis, spasms), difficulty with doing transfers (3), in particular, one participant mentioned that a 'period of illness made transfers and pressure relief difficult' and they had difficulty with clothing/shoes rubbing the skin (3).

3.7.2) *Any other information considered useful in understanding the problem of pressure sores*

Of the 60 people who returned completed questionnaires, 18 wrote additional information they considered useful in understanding the problem of pressure sores.

The comments were read through and the following categories were developed with the number of comments included in brackets; early diagnosis was considered important 'to prevent a chronic problem' (2), checking the skin once daily (4), doing more pressure relief (4), doing daily exercise and having a healthy diet (3), knowing one's skin tolerance (1), having more information on skin management (1), turning regularly in bed and having good positioning (2), educating carers in skin management (1).

Section Four: DISCUSSION

This section will start with an overview of the main findings of the study. The methodological limitations are then highlighted and findings considered in relation to previous research. Theoretical and clinical implications are then explored, potential issues for future research are suggested and the main conclusions are summarised.

4.1) Summary of Main Findings

4.1.1) Psychometric Properties of the Theory of Planned Behaviour Questionnaire

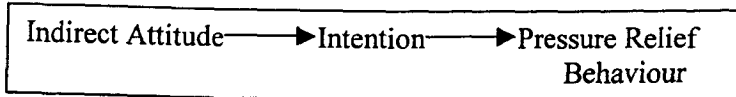
The measure specifically designed for this study based on the theory of planned behaviour (Ajzen, 1985) was found to have an acceptable overall level of internal reliability, with a Cronbach's alpha mean coefficient of .71. Test-retest reliability was also acceptable. All direct and indirect measures of theory of planned behaviour components were significantly correlated with each other, except for one component, perceived control for pressure relief. This suggests that the belief based-basis of the model is largely supported by this study. It is consistent with the theory of planned behaviour, which stipulates that indirect measures, representing the most salient beliefs, are the determinants of the direct measures of the attitude, subjective norm and perceived behavioural control constructs (Ajzen, 1991).

4.1.2) Findings Related to Hypotheses

In each section the main findings are presented in a series of boxes and summarised firstly in relation to pressure relief and secondly in relation to skin checking.

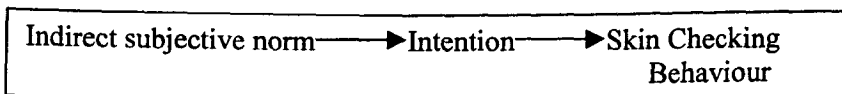
Theory of Planned Behaviour Components, Intention, Behaviour and Occurrence of Pressure Sores

For pressure relief variables:



A stepwise multiple regression indicated that indirect attitude towards pressure relief significantly predicted pressure relief intention, accounting for 34% of the variance. Perceived behavioural control did not have any significant predictive power. Several other theory of planned behaviour components were significantly correlated with pressure relief intention, but did not successfully enter the regression. Linear regression also indicated that pressure relief intention significantly predicted pressure relief behaviour, accounting for 41% of the variance. There was no evidence of a predictive relationship between perceived behavioural control and pressure relief behaviour. None of the theory of planned behaviour components, or intention for pressure relief significantly predicted the occurrence of pressure sores.

For skin checking variables:

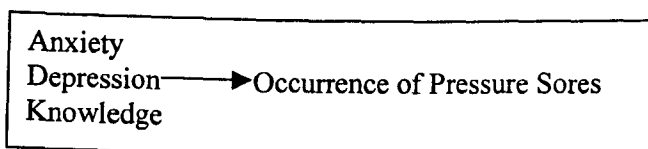


A stepwise multiple regression indicated that indirect subjective norm towards skin checking significantly predicted skin checking intention, accounting for 24% of the variance. Again, several other theory of planned behaviour components were significantly correlated with skin checking intention but did not successfully enter the regression. Linear regression also indicated that skin checking intention significantly

predicted skin checking behaviour, accounting for 45% of the variance. None of the theory of planned behaviour components, or intention for skin checking significantly predicted the occurrence of pressure sores.

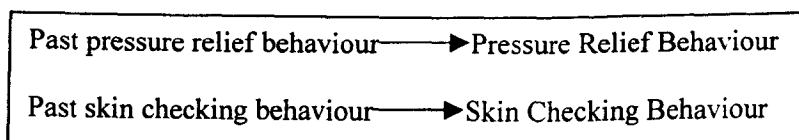
Psychological Variables, Behaviour and the Occurrence of Pressure Sores

Anxiety, Depression and Knowledge of Skin-Care Behaviours



Anxiety, depression and knowledge of skin-care behaviour did not predict pressure relief or skin checking behaviour. However, results of a logistic regression showed that they all significantly predicted the occurrence of pressure sores. Supplementary analysis using a Mann-Whitney test indicated that people with no history of pressure sores since discharge had significantly more knowledge of skin-care than those with a history of pressure sores since discharge. Spearman's rho correlation analysis indicated that there was a significant negative correlation between knowledge and number of pressure sores, indicating that having more knowledge of skin-care behaviour is associated with having fewer pressure sores. There were no significant differences in anxiety or depression for people with or without a history of pressure sores.

Past behaviour



Past behaviour played a significant role in predicting both pressure relief behaviour, accounting for 44% of the variance, and skin checking behaviour, accounting for 64% of the variance, using linear regression. However, there was no evidence of past behaviour predicting the occurrence of pressure sores.

Demographic and Disease Variables, Behaviour and Occurrence of Pressure Sores

For Pressure Relief Behaviour:

Level of injury → Pressure Relief Behaviour

A stepwise multiple regression indicated that level of injury (whether a person is paraplegic or tetraplegic) significantly predicted pressure relief behaviour, accounting for 28.3% of the variance. A Mann-Whitney test indicated that paraplegics performed significantly more pressure relief behaviour than tetraplegics.

For skin checking Behaviour:

Hours of Direct Care Daily → Skin Checking Behaviour

A stepwise multiple regression indicated that the number of hours direct care a person received daily was predictive of skin checking behaviour, accounting for 30.2% of the variance. People receiving more hours care daily performed significantly more skin checking. Further analysis indicated that people with complete injuries received significantly more hours care daily than those with incomplete injuries.

Completeness of Injury → Occurrence of Pressure Sores

Completeness of injury was also found to significantly predict the occurrence of pressure sores, with a logistic regression analysis indicating that people with complete injuries were thirteen times more likely ($\text{Exp (B)} = 13.15, p < .01$) to develop a pressure sore than people with an incomplete injury.

Theory of Planned Behaviour, Psychological Variables, Past Behaviour, Demographic and Disease Variables and Intention, Behaviour and Occurrence of Pressure Sores

For Pressure Relief Intention:

Past Behaviour
Indirect Perceived Control → Pressure Relief Intention

The final hypothesis assessing the role of psychosocial variables in predicting skin care intention, over and above the demographic and disease variables, found that for pressure relief intention, past behaviour and indirect perceived control were significant predictors, accounting for 61.2% of the variance. The predictors of pressure relief behaviour and occurrence of pressure sores could not be calculated because the assumptions for multiple regression were violated and multicollinearity problems for the logistic regression.

For Skin Checking Intention:

Age
Past Behaviour → Skin Checking Intention

For skin checking intention, age and past behaviour were significant predictors accounting for 78.8% of the variance. Age negatively predicted skin checking intention, accounting for 52% of the variance. The logistic regression model testing predictors of skin checking behaviour was not significant.

4.2) Methodological Issues

4.2.1) The Sample

The main study had a response rate of 31%. This corresponds well with the typical postal survey response rate (Goyder, 1985). The possibility of self-selection bias is raised due to the opt-in nature of the study. Possible sources of bias may be that the respondents were particularly interested in skin-care management or concerned about pressure sores. However conclusions cannot be made regarding potential bias because data was not routinely collected on non-respondents.

The demographic characteristics of the sample appeared to be representative of the spinal cord injured population, comprising 75% males and 25% females. This is akin to the American Spinal Cord Injury database finding that 82% of the spinal cord injury population were males and 18% were females (Go, DeVivo & Richards, 1995) and a UK sample in which 81% were males and 19% were females (Kennedy, 1995). The mean age of 41.25 years (SD= 12.63) in this sample appears representative, given that the mean age of injury in the spinal cord injured population is 30 years old (Kennedy, 2001), which accounts for the length of time since injury of up to ten years. Marital status also appeared to be representative (Go et al., 1995).

All of the participants in this study had their in-patient treatment and rehabilitation in a specialist spinal cord injury centre. These findings may not therefore be readily generaliseable to people who have received their treatment from a general hospital (This issue will be discussed further in Clinical Implications).

4.2.2) Theory of Planned Behaviour Questionnaire & Measurement of Actual Behaviour

The theory of planned behaviour template provided a complex means of measuring the individual components it comprised. Three shortcomings were encountered when the template was operationalised. Firstly, responses may have been open to bias in the latter half of the questionnaire regarding skin checking because questions and responses appeared in exactly the same format as the first half of the questionnaire regarding pressure relief. Whilst this did not appear to be a problem in this study, reversing more of the responses in the latter half of the questionnaire could counteract possible response bias in future studies. Secondly, there was an issue of unipolar versus bipolar scales. In following the guidelines recommended by Ajzen & Fishbein (1986) and Conner & Sparks (1996), mostly bipolar response options were employed throughout (e.g. good-bad) with response scales (e.g. 1, 2, 3, 4, 5, 6, 7). Other items (e.g. 2a to 2f) are in fact unipolar items, but with the same numerical response format. There is a possibility that respondents may have been confused by the same response format being used for both unipolar and bipolar items. Thirdly, in order to support the principle of compatibility, the recommended amount of behaviour was specified in each question i.e. for pressure relief- 2 minutes every hour and for skin checking once in the morning and once at night. Whilst this was helpful in ensuring that the same amount of behaviour was measured for each component of the theory of planned

behaviour, it was not ascertained in the questionnaire whether participants considered this to be a realistic amount and if not, how often participants actually performed the behaviour.

Despite this, few studies examining the theory of planned behaviour have included a measure of actual behaviour and so it was beneficial to include one here, by measuring behaviour again using the retest questionnaire. However, since the retest sample included only 17 respondents, interpretations of findings involving this measure should be made with caution.

4.2.3) Self-Report

When attempting to understand health behaviours self-report is often the most useful means of gathering information (Baldwin, 2000). Given the very nature of the theory of planned behaviour, self-report is a key way to obtain the highly personal information regarding one's attitudes, subjective norm, and perceived control in relation to skin-care behaviour direct from the participants themselves. Some researchers would argue that self-report is open to a social desirability bias. While this may be true, a postal questionnaire format is commonly used to measure the theory of planned behaviour. In addition, researchers who have assessed the influence of social desirability in a theory of planned behaviour questionnaire survey found its impact was minimal (Armitage & Conner, 1999).

In terms of getting an accurate measure of the person's actual behaviour, rather than just using self-report, observations may have been useful. However, this would have raised ethical issues regarding observing the participants privacy in their own homes.

The time required to observe pressure relief hourly and skin checking twice daily, also made observation impracticable. Reports from a carer could have offered additional information, but would only have been available from the proportion of the participants; i.e. those who received direct care.

4.2.4) The Reliability of the Theory of Planned Behaviour Measure

Overall, the theory of planned behaviour showed good reliability, with only a small number of scales showing lower internal reliability than desired. This is not uncommon in the literature, particularly with perceived control measures (Beale & Manstead, 1991, Sparks, 1994). It is however an issue to be aware of when interpreting the findings. The modest reliability of some scales (direct subjective norm and perceived control) suggests further analysis to identify and remove items from the scales with low internal reliability would help to improve the overall reliability of the individual scales. Further semi-structured interviews may also help to ascertain more salient beliefs. (For further discussion see Future Research). This could also help with the indirect attitude scale for skin checking. One item with low reliability was deleted from this scale, in order to improve its overall reliability, but this left it with only two items. This may account for indirect attitude significantly differing across time. Sparks, Hedderley & Shepherd (1992) reported a similar problem with low reliability when trying to measure attitude towards eating biscuits and dietary change and they too resorted to measuring attitude with a relatively small number of items.

4.2.5) Design and Statistical Analysis

This study was cross-sectional with a measure of behaviour at two time-points. This means that caution is needed when interpreting findings in terms of causality because

relationships may be bi-directional. It also makes it difficult to gain insight into the possible fluctuation in behaviour across time and its predictive factors, because extrinsic or intrinsic factors not identified in this study may disrupt the process at any stage.

The analyses used in this study were in line with previous research. However, this involved the implicit assumption that the data used in the theory of planned behaviour was interval, having been summed, multiplied and averaged (Rollinson, 2001).

4.3) Interpretation of Findings

Despite the methodological limitations, there were several interesting findings in this study. The main findings will now be discussed in more detail and in relation to previous research. Findings regarding the theory of planned behaviour, other psychological variables, demographic and disease variables will be discussed separately, followed by a discussion of the findings when all of the variables were considered together. Finally, evidence regarding the sufficiency of the model will be discussed. In each section, findings will be discussed firstly in relation to pressure relief and secondly in relation to skin checking.

4.3.1) The Theory of Planned behaviour

Both pressure relief behaviour and skin-checking behaviour were significantly predicted by intention. The few studies examining intentions and behaviour at separate time points have also found intentions to significantly predict behaviour (Ajzen, 1991, Conner & Sparks, 1997, Povey et al., 2000). This provides good support for the model.

When examining what theory of planned behaviour components might predict pressure relief intention, indirect attitude was the only significant predictor of pressure relief intention in the stepwise regression. This suggests that having a favourable attitude towards pressure relief leading to a positive valued outcome is associated with having a strong intention to perform pressure relief. This supports Zedjlik's (1991) suggestion that attitudes towards skin-care may influence people's adherence to skin-care regimes. Therefore, as with other research, such as women's intention to attend a cervical smear screening and people's intentions to eat a healthy diet, attitude played an important role in predicting intention (Bish, Sutton & Golombok, 2000, Povey et al., 2000).

Whilst several other theory of planned behaviour components were significantly correlated with pressure relief intention, they did not enter the regression, indicating that they did not predict any additional variance. One such variable was indirect perceived control. This was surprising in light of recent health behaviour research using the theory of planned behaviour, which has found perceived control to significantly predict intention and behaviour in the majority of studies (Armitage & Conner, 2001). However, whenever all other psychological, demographic and disease factors were later taken into account, indirect perceived control did predict pressure relief intention, in combination with past behaviour. This suggests that perceiving oneself to have the necessary resources to perform pressure relief significantly predicts intention. This finding will be discussed further in the section considering all of the variables together.

Regarding skin checking intention, indirect subjective norm was the only significant predictor in the stepwise regression. Contrary to this finding, a recent meta-analytic review concluded that the subjective norm construct was generally a weak predictor of intention, mainly due to it being measured by a single item (Armitage and Conner, 2001). However, this study used a multi-item scale, which Armitage & Conner (2001) suggest would increase its predictive ability. In particular the influence of family, friends with spinal cord injury and specialist spinal injury centre staff was correlated with skin checking intention. This suggests that the environmental context is important for people with spinal cord injury. People can be encouraged by significant others around them to check their skin, as long as they want to comply with their opinion. This suggests an important role for educating family members about the importance of skin checking and encouraging health professionals to remind patients to check their skin, or instruct others to check their skin for them. This will be discussed further in the Clinical Implications.

Attitude and indirect perceived control were also significantly correlated with skin checking intention, but did not enter the regression, indicating they did not predict any additional variance. This may in part be due to the less than desirable reliability for the perceived control measures for skin checking, or may simply reflect the fact that the predictive value of the components of the theory of planned behaviour varies across behaviours and situations (Ajzen, 1991). In this study, whilst intention predicted behaviour, different components of the theory of planned behaviour were important for predicting pressure relief and skin checking intention.

4.3.2) Other Psychological Factors

This study highlighted some interesting findings regarding the collective role of anxiety, depression and knowledge of skin-care behaviour. When examined individually, only knowledge of skin-care behaviour was significantly different between people with and without pressure sores and was significantly correlated with number of pressure sores. However, when they were examined collectively in a logistic regression, they all significantly predicted the occurrence of pressure sores. This suggests there is a complex interaction between anxiety, depression, knowledge of skin-care behaviour variables and pressure sores. One possibility is that people who are anxious may be more vigilant to behaviours like pressure relief and skin checking for fear of negative consequences, while people who are depressed may experience self-neglect and disengagement in skin-care behaviours as suggested by Herrick et al. (1998). Further research needs to examine these relationships in more detail. It is also of note that none of these variables predicted skin care behaviour, suggesting a direct relationship between them and the occurrence of pressure sores.

The finding that knowledge of skin care behaviour was significantly associated with occurrence and number of pressure sores suggests that the more knowledge people had the less likely they were to develop a pressure sore and if they did develop a pressure sore, people with more knowledge had fewer pressure sores and vice-versa. This was contrary to Garber et al.'s (1996) study, which found no association between people's knowledge of skin-care behaviours and pressure sores. However, the studies may not be directly comparable. Garber et al. (1996) looked specifically at the severity of the pressure sore and its progression in severity in relation to people's knowledge of pressure sore prevention strategies, rather than whether or not a

pressure sore had occurred, which was examined in this study. Also Garber et al. (1996) measured knowledge by asking people to list as many pressure sore prevention strategies as they could remember, whereas the SMnac (Berry & Kennedy, in press) employed in this study appears to offer a more sophisticated measure of the important aspects of skin-care behaviour and measurement of people's knowledge and understanding of how to do the behaviours.

This current study also highlighted the role of past behaviour in predicting future behaviour. This fits with previous research suggesting that past behaviour is the best independent predictor of future behaviour (Norman & Smith, 1995, Bozionelos & Bennett, 1999, Povey et al., 2000, Norman & Conner, 1996). However, some researchers argue that past behaviour cannot have a causal influence because it offers no independent explanatory value, being viewed more as a habit and not involving conscious thought processes (Ajzen, 1987). In this sense, a repeated behaviour leading to the formation of a habit may not need to be mediated by social cognition variables, suggesting it would bypass intention and have a direct influence on behaviour (Norman & Conner, 1996, Sutton 1997). However, in this study past behaviour predicted intention as well as actual behaviour, which will be discussed more later.

4.3.3) Demographic and Disease Factors

Demographic and disease factors were found to exert an influence on skin-care behaviour and directly influence the occurrence of pressure sores. The findings that paraplegics were more likely to do pressure relief than tetraplegics, and tetraplegics were more likely to develop a pressure sore than paraplegics, are supported by previous research (Yarkony & Heinemann, 1995). People receiving more hours direct

care daily from formal or informal carers also reported more skin checking behaviour than those receiving less care. This may be because the carer is motivating them to check their skin or is checking their skin for them.

It is also in line with previous research that people with complete injuries were more likely to develop a pressure sore. Salzberg et al. (1998) suggest that having no motor or functional sensation significantly increases one's risk of developing a pressure sore. All of these findings therefore indicate the influence of demographic and disease factors on the likelihood of performing skin-care behaviour and on the occurrence of pressure sores.

However, as with the theory of planned behaviour variables, whenever all of the variables were taken into account, some different findings emerged. In particular, age, which was previously not important in skin checking intention, significantly predicted a large proportion of people's intention to do skin checking. This will be discussed further in the following section.

4.3.4) Overall

When all of the factors were taken into account and controlled for, past behaviour and indirect perceived control were the most important factors predicting pressure relief intention. Together they predicted a large amount of the variance, demonstrating that the components of the theory of planned behaviour are contributing significantly to pressure relief intention. The specific items of indirect perceived control most highly correlated with pressure relief intention were; knowing how to do pressure relief, remembering the photographs of pressure sores which were shown in the in-patient

education classes and knowing one's sitting tolerance and pressure relief having been established as a habit. The former three issues are addressed as part of rehabilitation in specialist spinal cord injury centres. The latter one has already been discussed here, suggesting that it is important for the behaviour to be performed enough so that it eventually becomes habitually integrated into the persons' routine.

Regarding the link between past behaviour and indirect perceived control, Ajzen (1991) suggests that perceived control could play a mediating role in the relationship between past and future behaviour, because past behaviour is an important source of information regarding one's perceived control to repeat the behaviour.

Past behaviour was also a significant predictor of skin checking intention along with age. As mentioned previously, the association between age and pressure sores has been inconsistent in the literature, with some researchers finding younger age associated with occurrence (Young & Burns, 1981) and others suggesting older age (Ivie & DeVivo, 1994). Whilst this relationship could not be examined here due to violation of the assumptions of multiple regression and multicollinearity problems, older people were found to have significantly less intention to check their skin than younger people. This is an important finding in light of research with older adults indicating that older people with spinal cord injury are at greater risk of skin breakdown, due to the altered barrier properties of aging skin (Andrychuk, 1998).

There has been little research attention devoted to long-term health, medical and psychosocial outcomes related to aging in spinal cord injuries. Whiteneck et al. (1992) identified that people with spinal cord injuries had substantially lower life

expectancies than the general population and they exhibited a wide array of increasing physical limitations for example, reduced functional ability requiring more assistance, increased health complications, for example, pressure sores, pain, elevated blood pressure, occurring with aging in people with spinal cord injury. They stress that these changes accompanying aging in spinal cord injury are occurring earlier than in the general population. Therefore whilst the mean age (41 years old) of this sample may appear relatively young in terms of the general population, it is important to note that this population may experience the problems of older people from a younger age. Therefore, whilst researchers suggest one should be optimistic about the possibility of involving older people in the general population in preventative health behaviours and allow them to assume an appropriate level of responsibility for their health, it may be that older people with spinal cord injury will require more motivational or practical support to do skin checking, given their reduced intention and their increasing functional limitations.

Overall the findings of this study indicate that the theory of planned behaviour, depression, anxiety, knowledge of skin-care behaviours, past behaviour, demographic and disease factors influenced either behavioural intention, pressure relief or skin checking behaviour, or the occurrence of pressure sores. When all variables were considered together, past behaviour and indirect perceived control are important for pressure relief intention and age and past behaviour are important for skin checking intention.

4.4) Theoretical Implications

The theoretical implications for this study are the extent to which the findings support the theory of planned behaviour. The results provide empirical support for several aspects of the theory of planned behaviour. The finding that all but one of the indirect belief-based measures of the theory of planned behaviour constructs are significantly correlated with the direct measures provides majority support for the belief-based approach advocated by Ajzen (1991). These findings also correspond closely with other studies (Rollinson, 2001, Ajzen, 1991).

The relatively large amount of variance of actual pressure relief behaviour and skin checking behaviour accounted for by behavioural intentions also provides support for the theory of planned behaviour model. However, the small sample size and reliance on self-report put some constraints on this conclusion. The finding that indirect perceived control significantly predicted pressure relief intention supported the application of the theory of planned behaviour, rather than the theory of reasoned action, which does not include perceived control.

There was also a large amount of intention that was accounted for by past behaviour and as Ajzen (1991) argues, for this reason, the current theory is open to further elaboration if other determinants of skin care intention are identified. Gollwitzer (1993) suggests a possible addition would be 'implementation intentions'. Implementation intentions are an attempt to bridge the gap that exists in the theory of planned behaviour between intentions and behaviour. They aim to take intention a step further by specifying a time and a place where the behaviour will be performed, thus making it more likely that the person will perform the behaviour because they

have a specific plan of action. Research so far shows that implementation intentions improve the predictive validity of the behavioural intention component of the theory of planned behaviour (Orbell & Hodgkins 1994).

However, whilst components of the theory of planned behaviour were found to predict skin-care behaviour, it has been highlighted here that the theory is difficult to operationalise. Therefore, whilst suggestions made above to further elaborate the model are understandable and could provide more insight into the performance of health behaviours, to do so would run the risk of making future theory of planned behaviour questionnaires even more complicated.

It has already been mentioned that the internal reliability of the theory of planned behaviour questionnaire in this study is an issue that needs to receive further attention. This is particularly true of direct subjective norm and indirect perceived control for pressure relief and direct subjective norm and direct and indirect perceived control for skin checking. It may be that the measure of direct subjective norm has low reliability because as a measure of 'general social pressure' on the spinal cord injured person, it may not be very relevant. After all, pressure sores are not a risk to the general population and so it is unlikely that there will be a widely held opinion regarding this behaviour, in contrast to, for example, condom use or quitting smoking, where there is a society-wide opinion and government health message about what is appropriate healthy behaviour. Skin-care behaviour is a specific health behaviour, relevant to a select group of people and so it may be that people do not feel under general social pressure to perform it. Indirect subjective norm was a more reliable scale and may be more informative regarding the social pressure experienced from specific important

others who are more familiar with the spinal cord injury setting. In particular, these were family, friends with spinal cord injury and spinal cord injury staff.

4.5) Clinical Implications

The main clinical implications will be outlined here concerning in-patient education and continued education after discharge, education for families, identifying people at risk training of spinal cord injury health care staff and establishing behavioural engagement.

4.5.1) Skin-Care Education for People with Spinal Cord Injury

In order to maintain the physical well-being of the person with spinal cord injury, measures need to be taken to prevent the occurrence of pressure sores. As this study has shown and as other researchers suggest, developing a person's knowledge of skin-care behaviour early on will be important in the prevention of pressure sores. The qualitative data highlighted people's recognition that regular pressure relief and skin checking were important preventative strategies, as well as good positioning in bed and knowing one's skin tolerance. Therefore, education packages including, amongst other things, information on how pressure sores develop, how and when to inspect the skin and do pressure relief will all be important. Such education packages would aim to increase people's knowledge of pressure sore prevention strategies and also highlight for people the benefits of establishing a healthy skin-care regime of pressure relief and skin checking. It also appears from this study that knowing one's skin tolerance, an item identified in the indirect perceived control scale for pressure relief, is positively associated with one's intention to do pressure relief. Therefore attending a seating clinic would be useful, because there the amount of time an individual can

sit safely in one position without damaging their skin is measured. This tends to happen at specialist spinal cord injury centres.

By educating people early as in-patients, it offers the opportunity for them to learn the importance of skin-care management, how to do it, ask questions and practice pressure relief and skin checking behaviours, either themselves or through instructing someone else to help them. This study has shown that it is important for people to be educated early after injury so that they can establish a routine of performing skin-care behaviours, which is known to influence their performance of future skin-care behaviours.

When educating people about the risks of pressure sores and skin-care management, one also needs to keep in mind that people with spinal cord injury are having to adjust to many changes and a wealth of new information (Trieschmann, 1988), all of which can be overwhelming. As Graham (1997) points out 'it is not enough to assume that because a patient has been told what to do, he or she will comprehend or use this information' (p.395). Therefore, information needs to be presented in a simple, accessible way and constantly reinforced throughout rehabilitation (Graham, 1997). This will be discussed further in relation to staff training.

It is also important that some follow up support is provided for people with spinal cord injury, in relation to checking their knowledge of skin-care behaviour and their compliance to a skin-care regime, given that nearly a third of people living in the community develop pressure sores (Fuhrer et al., 1993). Garber et al. (1996) argue that whilst people are taught the principles of pressure sore prevention as in-patients,

it is not known how much of this is retained or what is retained and practiced once discharged.

Also in this study, people's knowledge of skin-care behaviour was negatively associated with occurrence of pressure sores, suggesting that people with pressure sores have less knowledge. Therefore despite people being exposed to pressure sores and perhaps being rehospitalised for treatment of a pressure sore, their knowledge base may remain low. Therefore re-educating people each time they attend outpatients appointments would be beneficial. This may be important in light of research showing that people with a history of a pressure sore are at increased risk of recurrence (Lehman 1995). This highlights the need for spinal cord injury centre staff to be diligent when in contact with people with a pressure sore to remind them about skin-care behaviour and check their skin-care routine.

4.5.2) Skin-Care Education for Families of People with Spinal Cord Injury

This study highlights the need to recognise the importance of the contextual factors associated with adherence to skin-care behaviours. The opinions of important people around the person with spinal cord injury appear to be important in influencing compliance with skin-care regimes. Educating family members about the following issues could be helpful in motivating and supporting the person with spinal cord injury in their adherence to a skin-care regime; the risk of pressure sores, the importance of skin-care behaviours, how and when their family member should perform skin-care behaviours and how they can assist them.

4.5.3) Identifying People at Increased Risk of Pressure Sores

This study has highlighted people who are at increased risk of developing a pressure sore or not performing skin-care behaviour within the spinal cord injured population. It is important that spinal cord injury staff are vigilant for in-patients who are tetraplegic, people with complete injuries, depressed people and older people. In particular, targeting these people with education, monitoring and assistance in order to establish healthy skin-care behaviours early could help prevent a pressure sore developing.

4.5.4) Staff Training

A common finding in research examining adherence to medical regimes, e.g. taking medication, is that patients do not always understand the instructions they are given to carry out medical behaviours and have a poor understanding of medical terminology used by the health professional. This can result in poor adherence (Horne 1998). Therefore, it is important that information regarding pressure sores and skin-care management is presented in a clear, user-friendly way. It may therefore be important for spinal cord injury ward staff, in particular nurses and auxiliaries who are most in contact with in-patients to receive some training in how to present this information.

It is also important that spinal cord injury staff provide the opportunity for the person to ask questions and discuss potential difficulties with establishing their skin-care routine. Those who have difficulty adhering to a skin-care routine as in-patients may benefit from seeing a clinical psychologist who may work with the person to understand and address any particular difficulties that may be affecting their behaviour.

These suggestions are relevant not only for in-patients in specialist spinal cord injury centres, but also for people with spinal cord injuries treated in general hospitals, who are not referred to specialist centres, and also for non-spinal cord injury patients, e.g. older people. An estimated 70% of pressure sores occur in patients over 70 years old (Bandolier 1994). Therefore health care staff in general hospitals and residential care settings for older people also need to be trained in pressure sore prevention strategies and assisting people to adhere to skin-care regimes.

4.5.5) Establishing Behavioural Engagement in Skin-care Regimes

This study has also shown that past behaviour is an important predictor of intention and behaviour. Therefore motivating people to establish skin-care behaviour as a habit will be important. Using behavioural approaches such as helping people to implement a plan of how to build these behaviours into their daily routine could achieve this (Gollwitzer, 1993). Alternatively, Grip & Merbitz (1986) suggest using assistive technology as a behavioural approach to get people engaged in pressure relief. They conducted a study using a computer device that offered continuous assessment of patient's pressure relief behaviour. After a period of time this was reviewed with the patient by a nurse, which allowed the patient to receive accurate feedback regarding the frequency and efficacy of their pressure relief behaviour. Merbitz (1996) suggests that once the behaviour is engaged in, retained and generalised using such a computer device, it becomes integrated into the person's life as a habitual behaviour. As Kennedy (2001) states 'health maintenance following spinal cord injury needs to be disciplined and consistent, with a failure to do so resulting in pressure sores' (p.449). Such a behavioural approach, generally

overlooked to date in relation to pressure relief in spinal cord injury, could be a means of establishing pressure relief behaviour as a habit.

As for skin checking, having the knowledge of how to do skin checking, as well as implementation intentions and encouragement from others, could all contribute to adherence.

4.6) *Future Research*

This study has highlighted several options for future research. Importantly, more exploration of the role of the theory of planned behaviour in relation to skin-care behaviour would need to be preceded by attempts to improve the reliability of some of the measures, in particular, perceived behavioural control. More interviews could be beneficial to get a wider consensus on what beliefs are most salient. There could then be further exploration of the relationship between past behaviour and indirect perceived control for pressure relief. As Ajzen (1988) suggests the effect of past behaviour may be mediated by perceived control and past behaviour may provide an important source of information about a person's sense of self-control (Norman & Conner, 1996).

Researchers are also suggesting the need to further research past behaviour as a predictor of future behaviour. For example, it would be useful to assess whether the predictive role of past behaviour is really as a habit and therefore not mediated by social cognition variables, or whether it provides valid information regarding ease or difficulty of the behaviour (Ajzen, 1991). Sutton (1994) suggests past behaviours are not so much habits as routines, which require environmental reminders to perform

them. Perhaps in this sense measuring the relationship between past behaviour and implementation intentions (e.g. time of day) could help explain the relationship between past behaviour, behavioural intention and skin-care behaviour.

Another suggestion for future research, based on the clinical implications outlined here, is to evaluate the effectiveness of the patient education packages and prevention strategies taught (Garber et al. 1996).

Finally longitudinal research into the role of the theory of planned behaviour and all of the other factors mentioned here, would allow us to talk more confidently about the direction of causation of these variables.

4.7) Conclusion

In this study, the theory of planned behaviour and other psychological factors, were helpful in predicting intention, skin-care behaviour and occurrence of pressure sores. Demographic and disease factors were also helpful. However, overall the combination of past behaviour and indirect perceived control, and past behaviour and age were particularly important predictors of pressure relief intention and skin checking intention respectively. These findings point to the need for more research into the role of the theory of planned behaviour in predicting skin-care behaviour, further work on improving the reliability of measures of perceived control and exploration of its relationship with past behaviour. The importance of interventions aimed at educating and training patients, their families and staff in skin-care strategies and encouraging behavioural engagement early on in rehabilitation has been highlighted.

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APPENDICES

- Appendix 1: Hospital Anxiety and Depression Scale***
- Appendix 2: Skin Management Needs Assessment Checklist (SMnac)***
- Appendix 3: Pilot Interview Consent Form***
- Appendix 4: Pilot Interview Questions***
- Appendix 5: Information Letter***
- Appendix 6: Instruction Sheet***
- Appendix 7: Skin Care Management Questionnaire***
- Appendix 8: Ethics Approval***
- Appendix 9: Spinal Cord Injury Levels***

**TEXT
BOUND INTO THE
SPINE**

HOSPITAL ANXIETY AND DEPRESSION SCALE (HADS)

Appendix 1:

NAME DATE

Clinicians are aware that emotions play an important part in most illnesses. If your clinician knows about these feelings he or she will be able to help you more.

This questionnaire is designed to help your clinician to know how you feel. Read each item below and UNDERLINE THE REPLY which comes closest to how you have been feeling in the past week. Ignore the numbers printed at the edge of the questionnaire.

Don't take too long over your replies. Your immediate reaction to each item will probably be more accurate than a long, thought-out response.

A	D			A	D
3 2 1 0		I feel tense or 'wound up' <i>most of the time</i> <i>a lot of the time</i> <i>from time to time, occasionally</i> <i>not at all</i>	I feel as if I am slowed down <i>nearly all the time</i> <i>very often</i> <i>sometimes</i> <i>not at all</i>		3 2 1 0
	0 1 2 3	I still enjoy the things I used to enjoy <i>definitely as much</i> <i>not quite so much</i> <i>only a little</i> <i>hardly at all</i>	I get a sort of frightened feeling like 'butterflies' in the stomach <i>not at all</i> <i>occasionally</i> <i>quite often</i> <i>very often</i>	0 1 2 3	
3 2 1 0		I get a sort of frightened feeling as if something awful is about to happen <i>very definitely and quite badly</i> <i>yes, but not too badly</i> <i>a little, but it doesn't worry me</i> <i>not at all</i>	I have lost interest in my appearance <i>definitely</i> <i>I don't take as much care as I should</i> <i>I may not take quite as much care</i> <i>I take just as much care as ever</i>		3 2 1 0
	0 1 2 3	I can laugh and see the funny side of things <i>as much as I always could</i> <i>not quite so much now</i> <i>definitely not so much now</i> <i>not at all</i>	I feel restless as if I have to be on the move <i>very much indeed</i> <i>quite a lot</i> <i>not very much</i> <i>not at all</i>	3 2 1 0	
3 2 1 0		Worrying thoughts go through my mind <i>a great deal of the time</i> <i>a lot of the time</i> <i>not too often</i> <i>very little</i>	I look forward with enjoyment to things <i>as much as I ever did</i> <i>rather less than I used to</i> <i>definitely less than I used to</i> <i>hardly at all</i>		0 1 2 3
	3 2 1 0	I feel cheerful <i>never</i> <i>not often</i> <i>sometimes</i> <i>most of the time</i>	I get sudden feelings of panic <i>very often indeed</i> <i>quite often</i> <i>not very often</i> <i>not at all</i>	3 2 1 0	
0 1 2 3		I can sit at ease and feel relaxed <i>definitely</i> <i>usually</i> <i>not often</i> <i>not at all</i>	I can enjoy a good book or radio or television programme <i>often</i> <i>sometimes</i> <i>not often</i> <i>very seldom</i>		0 1 2 3

NOW PLEASE CHECK YOU HAVE ANSWERED ALL 14 QUESTIONS

	A	D
TOTAL		

MANAGEMENT

Answer all of the following questions, using the key below, by circling the number which you consider to be most appropriate.

- 0 = completely dependent/never do 2 = moderately independent/usually do (or instruct someone to)
- 1 = mostly dependent/rarely do 3 = completely independent/always do (or instruct someone to)
- N/A = Not applicable

CONSENT FORM

Checks

Do you know how to check your skin with a mirror?	0	1	2	3	N/A
Do you know what to look for, and where to look?	0	1	2	3	N/A
Do you carry out this skin checking as instructed?	0	1	2	3	N/A

Preventing Pressure Sores

Do you know how to relieve pressure by lifting, turning etc?	0	1	2	3	N/A
Do you know how often and for how long to try out pressure relief?	0	1	2	3	N/A
Can you (or do you instruct others to)* change position in bed?	0	1	2	3	N/A
Can you (or do you instruct others to)* position pillows correctly in bed?	0	1	2	3	N/A

Preventing Skin Injuries

Are you aware of the danger of zips, seams, papers, etc?	0	1	2	3	N/A
Are you aware of the danger of hot objects (coffee cups, hot water bottles, the sun)?	0	1	2	3	N/A
Can you (or do you instruct others to)* avoid tapes/bumps when transferring?	0	1	2	3	N/A
Do you (or do you instruct others to)* regularly check for ingrowing toenails?	0	1	2	3	N/A

PLEASE DELETE AS APPLICABLE

Stoke Mandeville

Hospital NHS Trust



Stoke Mandeville Hospital NHS Trust
Mandeville Road
Aylesbury
Buckinghamshire
HP21 8AL

Tel: 01296 315000

CONSENT FORM

Spinal cord injury and pressure sores - an exploration of psychological factors associated with pressure sores

Name of Researcher: Ruth Sheppard

Please read the enclosed letter of information before completing this consent form.

1. I confirm that I have read and understand the letter of information, dated 31 October 2001, for the above study and have had the opportunity to ask questions. ☐
2. I understand that my participation is voluntary and that I am free to withdraw, at any time, without giving any reason, without my medical treatment being affected. ☐
3. I agree to take part in the above study. ☐

Name Date.....

Telephone number.....

Signature.....

Skin Care Management Interview

Name:

Level Of Injury:

Pressure Sore: Yes/No

- 1) How Do You Do Pressure Relief?
- 2) How Do You Check Your Skin?

<i>Definition Of The Behaviour Is:</i> 1) Pressure Relief I.E. Lifting/Shifting Position (2 Minutes Every Hour) 2) Skin Checking Twice Daily (Before Bed, When Getting Up)
--

Pressure Relief

Perceived Behavioural Control

- 3) What Sorts Of Things Help You To Do Pressure Relief?
- 4) What Sorts Of Things Prevent You From Doing Pressure Relief? E.G. Being At Work, Being Out Socialising Etc

Subjective Norm

- 5) Which Groups Of People/Which Individuals Influence Whether You Check Your Skin?/Come To Mind When You Think About Doing Pressure Relief?

Attitudes

- 6) What Do You See As The Advantages Of Doing Pressure Relief?
- 7) What Do You See As The Disadvantages Of Doing Pressure Relief?

Skin Checking

Perceived Behavioural Control

- 8) What Sorts Of Things Might Help You To Check Your Skin?
- 9) What Sorts Of Things Might Prevent/Stop You From Checking Your Skin?

Subjective Norm

- 10) Which Group Of People/Which Individuals Influence Whether You Shift Your Position/Come To Mind When You Think About Checking Your Skin?

Attitudes

- 11) What Do You See As The Advantages Of Checking Your Skin?
- 12) What Do You See As The Disadvantages Of Checking Your Skin?
- 13) What Would You Do If You Discovered A Pressure Mark?

Any Other Comments

Thank You.

Stoke Mandeville

Hospital NHS Trust



DEPARTMENT OF CLINICAL PSYCHOLOGY

NATIONAL SPINAL INJURIES CENTRE

DR PAUL KENNEDY: 01296 315822 (direct line)

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Dear

spinal cord injury and pressure sores- an exploration of psychological factors associated with pressure sores.

As you know, pressure sores are a problem for people with spinal cord injuries. I am Ruth Sheppard, a clinical psychologist in training working with Dr Paul Kennedy, Consultant Clinical Psychologist. We are interested in finding out more about pressure sores and people with spinal cord injury. In particular, we are interested in personal responses that may affect this important issue.

It is hoped that the results of this study will enable us to design and improve appropriate rehabilitation packages offered to people with SCI after their injury, and help improve the prevention of pressure sores.

You have been given this information sheet to ask if you would consider taking part in our research. Your participation would involve completing three fairly short questionnaires. These cover a range of topics including your beliefs about skin-care, your psychological well-being and some questions regarding pressure sores you may have had in the past.

Participation in this study is entirely voluntary. If you decide to take part you are still free to withdraw at any time without giving a reason. This would not affect any treatment you receive.

All information you provide will be treated with complete confidentiality. Returned questionnaires will be kept in a locked cabinet in the Psychology Department of the Stoke Mandeville Hospital and will not be accessible to anyone other than myself, or Dr Paul Kennedy.

If you are willing to participate in the study, please complete the questionnaire and return it to me in the envelope provided by 12 March 2002. If you have any questions regarding this research, you would like some assistance to complete the questionnaires, or experience any emotional distress when completing the questionnaires please do not hesitate to contact me, Ruth Sheppard, on 01296 315823.

Thank you for your time.

Ruth Sheppard
Clinical Psychologist in Training

Dr Paul Kennedy
Consultant Clinical Psychologist

Pressure relief and skin checking: questionnaire based on the theory of planned behaviour**Instructions**

Please answer the following questions according to your own experience of living with a spinal cord injury. There is no need to spend a long time thinking about your answers- just give your initial response.

Please answer the questions as accurately and honestly as you can. There are no right or wrong answers.

Some parts of the questionnaire may appear repetitive and the answers to some questions may seem obvious. This is because the questions are designed according to a particular theory, which means the questions have to be asked in this way. Please answer all of the questions.

Many of the questions require you to circle a number on a scale. Please circle the number which best describes your own opinion. For example, if you strongly agree that eating healthy food is very important for your physical well-being, then you would respond like this:

Eating healthy food is very important for my physical well-being

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

However, if you slightly disagree with this statement, you would respond like this:

Eating healthy food is very important for my physical well-being

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

If you do not agree or disagree with this statement, you would respond like this:

Eating healthy food is very important for my physical well-being

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

If you have any questions regarding filling out this questionnaire, please do not hesitate to telephone either of the phone numbers on the last page of the questionnaire. We would be happy to help you.

This questionnaire will ask you questions firstly, about doing pressure relief on average for 2 minutes every hour and secondly, checking your skin once every morning and once every night.

PRESSURE RELIEF

Section One

This section asks questions about your attitude to doing pressure relief over the next week.

First, please answer this general question:

In my opinion, doing pressure relief, on average, for 2 minutes every hour over the next week would be:

a) Good	1	2	3	4	5	6	7	Bad
b) Foolish	1	2	3	4	5	6	7	Wise
c) Harmful	1	2	3	4	5	6	7	Beneficial
d) Helpful	1	2	3	4	5	6	7	Unhelpful
e) Useful	1	2	3	4	5	6	7	Useless
f) Unpleasant	1	2	3	4	5	6	7	Pleasant
g) Unenjoyable	1	2	3	4	5	6	7	Enjoyable

Pressure relief may have a number of consequences. Now, please rate how likely each of the following consequences would be if you were to do pressure relief on average for 2 minutes every hour, over the next week:

It would prevent pressure sores.

Very Unlikely 1 2 3 4 5 6 7 Very Likely

It would prevent spending time in bed waiting for a sore to heal.

Very Unlikely 1 2 3 4 5 6 7 Very Likely

It would mean avoiding stays in hospital.

Very Unlikely 1 2 3 4 5 6 7 Very Likely

It would relieve pain and discomfort.

Very Unlikely 1 2 3 4 5 6 7 Very Likely

It would help improve blood circulation.

Very Unlikely 1 2 3 4 5 6 7 Very Likely

It would cause discomfort.

Very Unlikely 1 2 3 4 5 6 7 Very Likely

Now, please rate how much of a priority each of these consequences are to you.

Is a priority to me to prevent pressure sores.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Is a priority to me to prevent time in bed waiting for a sore to heal.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Is a priority to me to avoid stays in hospital.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Is a priority to me to relieve pain and discomfort.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Is a priority to me to improve blood circulation.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Is a priority to me to cause myself discomfort.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Section 2

This section asks you about the opinions of other people regarding pressure relief. They ask if you think these people would like you to do pressure relief, on average, for 2 minutes every hour over the next week.

Please consider whether each of the following people would like you to do pressure relief, on average, for 2 minutes every hour over the next week. If you are not sure, try to guess or imagine what you think their opinion would be.

People under pressure from people I know to do pressure relief for 2 minutes every hour, over the next week.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

People who are important to me would approve of me doing pressure relief for 2 minutes every hour, over the next week.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

People who are important to me would want me to do pressure relief for 2 minutes every hour, over the next week.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

My family/partner would want me to do pressure relief for 2 minutes every hour, over the next week.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

Friends would want me to do pressure relief for 2 minutes every hour, over the next week.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

People with experience of a spinal cord injury (e.g. other ex-patients) would want me to do pressure relief for 2 minutes every hour, over the next week.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

Doctors, nurses, consultants at the hospital would want me to do pressure relief for 2 minutes every hour, over the next week.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

Now, please rate how much you want to do what these people think you should do with regard to pressure relief, on average, for 2 minutes every hour over the next week.

I want to do what my family think I should do...

Not at all 1 2 3 4 5 6 7 Very much

I want to do what my friends think I should do...

Not at all 1 2 3 4 5 6 7 Very much

I want to do what people with experience of spinal cord injury (e.g. other ex-patients) think I should do...

Not at all 1 2 3 4 5 6 7 Very much

I want to do what the doctors, nurses, consultants at the hospital think I should do...

Not at all 1 2 3 4 5 6 7 Very much

on 3

The question asks you about factors that might make it more likely or more unlikely for you to do pressure relief, on average, for 2 minutes every hour over the next week.

Now, please answer these general questions:

Whether I do or do not do pressure relief, on average, for 2 minutes every hour over the next week is entirely up to me...

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

How much control do you feel you have over doing pressure relief, on average, for 2 minutes every hour, over the next week?

No control 1 2 3 4 5 6 7 Complete control

How confident that I could do pressure relief, or instruct someone to help me with pressure relief, on average, for 2 minutes every hour over the next week if I wanted to...

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

How difficult for me to do pressure relief, on average, for 2 minutes every hour over the next week is ...

Very Difficult 1 2 3 4 5 6 7 Very Easy

How confident (see answer part e) if due to your level of injury, a carer/family member/partner helps you to do pressure relief

How confident about my carer's/family member's/partner's ability to help with pressure relief.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

Now, please rate how likely it is that each of the following would occur during the next week:

I would feel self-conscious or embarrassed about doing pressure relief...

Very likely 1 2 3 4 5 6 7 Very unlikely

I would be busy doing things or at work...

Very likely 1 2 3 4 5 6 7 Very unlikely

I would remember the photographs of pressure sores that I saw in hospital...

Very likely 1 2 3 4 5 6 7 Very unlikely

That I would know how to do pressure relief...

Very likely 1 2 3 4 5 6 7 Very unlikely

That I would feel discomfort or spasms...

Very likely 1 2 3 4 5 6 7 Very unlikely

I would ask others to help me to do pressure relief...

Very likely 1 2 3 4 5 6 7 Very unlikely

I would feel lazy...

Very likely 1 2 3 4 5 6 7 Very unlikely

that I would be aware of my skin tolerance...

Very likely	1	2	3	4	5	6	7	Very unlikely
-------------	---	---	---	---	---	---	---	---------------

that I would remember what it was like to have a pressure sore...

Very likely	1	2	3	4	5	6	7	Very unlikely
-------------	---	---	---	---	---	---	---	---------------

that I would be sitting on a different or unfamiliar surface...

Very likely	1	2	3	4	5	6	7	Very unlikely
-------------	---	---	---	---	---	---	---	---------------

doing pressure relief would be an automatic habit...

Very likely	1	2	3	4	5	6	7	Very unlikely
-------------	---	---	---	---	---	---	---	---------------

Now, please rate the extent to which each of these factors would make it *more unlikely or more*

likely to do pressure relief, on average, for 2 minutes every hour, over the next week.

Feeling self-conscious or embarrassed about doing pressure relief, would make this...

More Unlikely	1	2	3	4	5	6	7	More Likely
---------------	---	---	---	---	---	---	---	-------------

Being busy or being at work would make this...

More Unlikely	1	2	3	4	5	6	7	More Likely
---------------	---	---	---	---	---	---	---	-------------

Remembering the photographs of pressure sores that I saw when I was in hospital would make this...

More Unlikely	1	2	3	4	5	6	7	More Likely
---------------	---	---	---	---	---	---	---	-------------

Knowing how to do pressure relief would make this...

More Unlikely	1	2	3	4	5	6	7	More Likely
---------------	---	---	---	---	---	---	---	-------------

Feeling discomfort or having a spasm would make this...

More Unlikely	1	2	3	4	5	6	7	More Likely
---------------	---	---	---	---	---	---	---	-------------

Asking others to help me would make this...

More Unlikely	1	2	3	4	5	6	7	More Likely
---------------	---	---	---	---	---	---	---	-------------

Feeling lazy would make this...

More Unlikely	1	2	3	4	5	6	7	More Likely
---------------	---	---	---	---	---	---	---	-------------

Being aware of my skin tolerance would make this...

More Unlikely	1	2	3	4	5	6	7	More Likely
---------------	---	---	---	---	---	---	---	-------------

Remembering what it was like to have a pressure sore would make this...

More Unlikely	1	2	3	4	5	6	7	More Likely
---------------	---	---	---	---	---	---	---	-------------

Sitting on a different or unfamiliar surface would make this...

More Unlikely	1	2	3	4	5	6	7	More Likely
---------------	---	---	---	---	---	---	---	-------------

Pressure relief being an automatic habit would make this...

More Unlikely	1	2	3	4	5	6	7	More Likely
---------------	---	---	---	---	---	---	---	-------------

Question 4

Past week

During the past week, I did pressure relief, on average, for 2 minutes every hour.

Definitely did not 1 2 3 4 5 6 7 Definitely did

How often did you do pressure relief over the past week?

Not at all 1 2 3 4 5 6 7 Every hour

Next week

I intend to do pressure relief, on average, for 2 minutes every hour over the next week.

Definitely do not 1 2 3 4 5 6 7 Definitely do

I will do pressure relief, on average, for 2 minutes every hour over the next week.

Definitely yes 1 2 3 4 5 6 7 Definitely no

How likely is that you will do pressure relief, on average, for 2 minutes every hour over the next week?

Unlikely 1 2 3 4 5 6 7 Likely

SKIN CHECKING

Now we have covered pressure relief, we shall look at skin checking.

Section One

This section asks about your attitude to checking your skin over the next week.

Please first answer these general questions:

In my opinion, checking my skin once in the morning and once at night in the next week would be:

a) Good 1 2 3 4 5 6 7 Bad

b) Foolish 1 2 3 4 5 6 7 Wise

c) Harmful 1 2 3 4 5 6 7 Beneficial

d) Helpful 1 2 3 4 5 6 7 Unhelpful

e) Useful 1 2 3 4 5 6 7 Useless

f) Pleasant 1 2 3 4 5 6 7 Unpleasant

g) Unenjoyable 1 2 3 4 5 6 7 Enjoyable

Checking your skin may result in a number of possible consequences. Please rate how likely each of the following consequences would be if you were to check your skin once every morning and once every night, over the next week.

It would prevent pressure sores.

Very unlikely	1	2	3	4	5	6	7	Very likely
---------------	---	---	---	---	---	---	---	-------------

It would mean catching the pressure sore at the early stages.

Very unlikely	1	2	3	4	5	6	7	Very likely
---------------	---	---	---	---	---	---	---	-------------

It would take too much time to check my skin.

Very unlikely	1	2	3	4	5	6	7	Very likely
---------------	---	---	---	---	---	---	---	-------------

Now, Please rate how much of a priority each of these consequences are to you.

It is a priority to me to prevent pressure sores.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
-------------------	---	---	---	---	---	---	---	----------------

It is a priority to me to catch a pressure sore at the early stages.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
-------------------	---	---	---	---	---	---	---	----------------

It is a priority to me to take time to check my skin.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
-------------------	---	---	---	---	---	---	---	----------------

Section 2

This section asks you about the opinions of other people regarding skin checking. They ask if these people would like you to check your skin once every morning and once every night, over the next week.

Please consider whether the following people would like you to check your skin once every morning and once every night over the next week. If you are not sure, try to guess or imagine what their response might be.

Do you feel under pressure from people I know to check my skin once every morning and once every night, over the next week?

Strongly agree	1	2	3	4	5	6	7	Strongly disagree
----------------	---	---	---	---	---	---	---	-------------------

Do most people who are important to me would approve of me checking my skin once every morning and once every night, over the next week.

Would approve	1	2	3	4	5	6	7	Would disapprove
---------------	---	---	---	---	---	---	---	------------------

Do most people who are important to me would want me to check my skin once every morning and once every night, over the next week.

Strongly agree	1	2	3	4	5	6	7	Strongly disagree
----------------	---	---	---	---	---	---	---	-------------------

My family/partner would want me to check my skin once every morning and once every night, over the next week.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

My friends would want me to check my skin once every morning and once every night, over the next week.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

People with experience of a spinal cord injury (e.g. other ex-patients) would want me to check my skin once every morning and once every night, over the next week.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

Doctors, nurses, consultants at the hospital would want me to check my skin once every morning and once every night, over the next week.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

Now please rate how much you want to do what these people think you should do with regard to checking your skin once every morning and once every night, over the next week.

I want to do what my family think I should do...

Not at all 1 2 3 4 5 6 7 Very much

I want to do what my friends think I should do...

Not at all 1 2 3 4 5 6 7 Very much

I want to do what people with experience of spinal cord injury (e.g. other ex-patients) think I should do...

Not at all 1 2 3 4 5 6 7 Very much

I want to do what the doctors, nurses, consultants at the hospital think I should do...

Not at all 1 2 3 4 5 6 7 Very much

tion 3

section asks you about factors that might make it more likely or more unlikely for you to check your skin once
by morning and once every night over the next week.

First, please answer these general questions:

Whether I do or do not check my skin once every morning and once every night over the next week is entirely
to me...

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

How much control do you feel you have over checking your skin once every morning and once every night over
the next week?

No control 1 2 3 4 5 6 7 Complete control

I am confident that I could check my skin, or instruct someone to check my skin, once every morning and once
every night over the next week if I wanted to...

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

For me to check my skin once every morning and once every night over the next week is ...

Very Difficult 1 2 3 4 5 6 7 Very Easy

Please answer the following question if, due to your level of injury, a carer or family member/partner
checks your skin for you:

It is my responsibility to educate my carer/family member/partner about how to check my skin.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

Now, please rate how likely it is that each of the following would occur during the next week:

Having access to a mirror.

Very Unlikely 1 2 3 4 5 6 7 Very Likely

Being in an unfamiliar environment or transferring onto unfamiliar surfaces.

Very Unlikely 1 2 3 4 5 6 7 Very Likely

Having help from a carer/family member/partner to check my skin.

Very Unlikely 1 2 3 4 5 6 7 Very Likely

Having symptoms such as dry skin or spasms.

Very Unlikely 1 2 3 4 5 6 7 Very Likely

Remembering the photographs of pressure sores that I saw in hospital.

Very Unlikely 1 2 3 4 5 6 7 Very Likely

Being afraid of developing pressure sores.

Very Unlikely	1	2	3	4	5	6	7	Very Likely
---------------	---	---	---	---	---	---	---	-------------

Having patchy sensation in my lower limbs.

Very Unlikely	1	2	3	4	5	6	7	Very Likely
---------------	---	---	---	---	---	---	---	-------------

Being in a hurry.

Very Unlikely	1	2	3	4	5	6	7	Very Likely
---------------	---	---	---	---	---	---	---	-------------

Being tired.

Very Unlikely	1	2	3	4	5	6	7	Very Likely
---------------	---	---	---	---	---	---	---	-------------

Due to your level of injury, someone else checks your skin for you, please answer this statement:

My carer/family member/partner would understand the need to check my skin.

Very Unlikely	1	2	3	4	5	6	7	Very Likely
---------------	---	---	---	---	---	---	---	-------------

Now please rate the extent to which each of these factors would make it *more unlikely or more likely* to check your skin every morning and every night, over the next week.

Having access to a mirror would make this...

More unlikely	1	2	3	4	5	6	7	More Likely
---------------	---	---	---	---	---	---	---	-------------

Being in a unfamiliar environment or transferring onto unfamiliar surfaces would make this...

More unlikely	1	2	3	4	5	6	7	More Likely
---------------	---	---	---	---	---	---	---	-------------

Receiving help from a carer/family member/partner would make this...

More unlikely	1	2	3	4	5	6	7	More Likely
---------------	---	---	---	---	---	---	---	-------------

Having symptoms such as dry skin or spasms would make this...

More unlikely	1	2	3	4	5	6	7	More Likely
---------------	---	---	---	---	---	---	---	-------------

Remembering the photographs of pressure sores that I saw in hospital would make this...

More unlikely	1	2	3	4	5	6	7	More Likely
---------------	---	---	---	---	---	---	---	-------------

Being afraid of developing pressure sores would make this...

More unlikely	1	2	3	4	5	6	7	More Likely
---------------	---	---	---	---	---	---	---	-------------

Having patchy sensation in my lower limbs would make this...

More unlikely	1	2	3	4	5	6	7	More Likely
---------------	---	---	---	---	---	---	---	-------------

Being in a hurry would make this...

More unlikely	1	2	3	4	5	6	7	More Likely
---------------	---	---	---	---	---	---	---	-------------

ing tired would make this...

More unlikely 1 2 3 4 5 6 7 More Likely

carer/family member/partner would understand the need to check my skin...

More unlikely 1 2 3 4 5 6 7 More Likely

tion 4

week

During the past week, I checked my skin once every morning and once every night.

Definitely did not 1 2 3 4 5 6 7 Definitely did

How often did you check your skin over the past week?

Not at all 1 2 3 4 5 6 7 Twice every day

at week

I intend to check my skin once every morning and once every night, over the next week.

Definitely do not 1 2 3 4 5 6 7 Definitely do

I will check my skin once every morning and once every night, over the next week.

Definitely yes 1 2 3 4 5 6 7 Definitely no

How likely is that you will check your skin once every morning and once every night, over the next week?

Unlikely 1 2 3 4 5 6 7 Likely

Section 5 – Personal details

How old are you? _____ years

Are you male/female (please delete)

Marital Status (Please tick):

☐ Single

☐ Married

☐ Divorced/Separated

☐ Living with partner

☐ Other (Please specify) _____

How long ago were you injured? _____ years and _____ months

How many hours of direct care do you receive per day? _____ hours

(This includes paid carers/informal carers/relatives)

a) What is your level of injury? (e.g. C5, T4) _____

b) Is your injury complete _____ or incomplete _____ (please tick appropriate option)

Have you had any pressure sores since your discharge? Yes _____ / No _____ (please tick appropriate option)

If so, how many pressure sores have you had? _____

How many days bed rest did this involve altogether? (please estimate) _____ days

What was the estimated width of the pressure sore? NB. If you had more than one pressure sore, please state the width of the worst one (in centimetres or inches) _____ cms/ _____ inches

What was the estimated depth of the pressure sore? NB. If you had more than one pressure sore, please state depth of the worst one by ticking one of the following categories.

Very superficial sore _____

Shallow sore _____

Deep sore _____

If you have had a pressure sore, please list what you consider to have been likely causes.

Are there any other comments or pieces of information that you think would be useful in understanding this item?

Part of this research it will be necessary to re-contact a random sample of participants. These participants will be asked to fill in the skin care management part of this questionnaire one more time. This enables us to check if people's responses remain constant over time and is a normal procedure in this type of research. If you are willing to be re-contacted once more, please provide your name and address below. This information will remain confidential and will only be used for this purpose. Your name and address will not be passed on to anyone else.

Name _____ Address _____

Thank you very much for completing this questionnaire. Please now post this questionnaire in the addressed envelope provided.

If you require any further information, please contact:

Dr Sheppard
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Stoke Mandeville
Hospital NHS Trust

Buckinghamshire Health Authority

Aylesbury Vale Local Research Ethics Committee

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E-mail: Peter.Mansfield@smh.nhs.uk

30th January 2002

Miss R Sheppard
Trainee Clinical Psychologist
Isis Education Centre
Warneford Hospital
Headington
Oxford OX3 7JX

Dear Miss Sheppard,

Re: Project NC1072 – The Role of the Theory of Planned Behaviour and Other Psychological Factors in the Aetiology of Pressure Sores in People with Spinal Cord Injuries

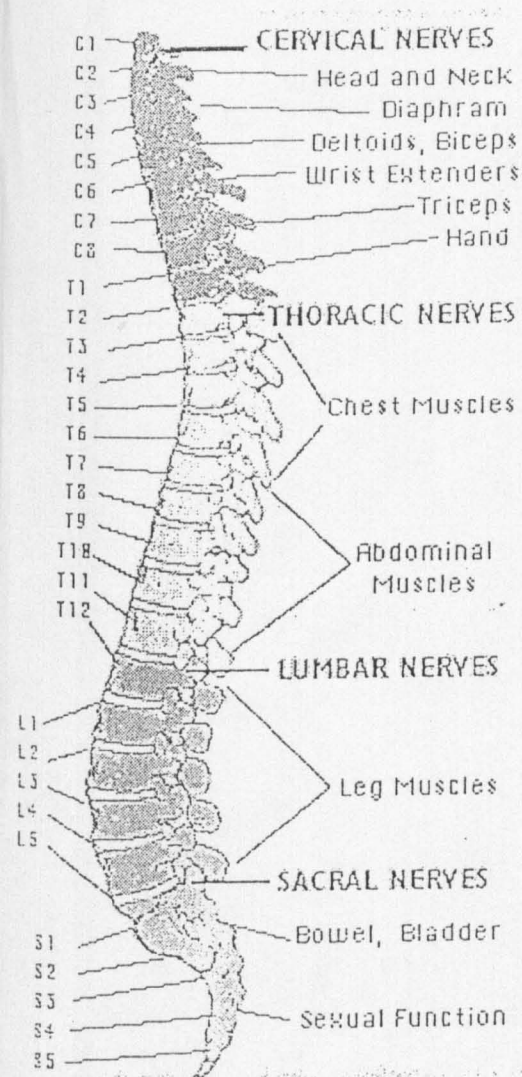
Thank you for your letter dated 11th January 2002.

The Chairman has considered the revised questionnaire and has taken 'Chairman's Action' and approved it. He has also given approval for you to proceed to the main project.

Yours sincerely

PETER MANSFIELD
Secretary to Local Research Ethics Committee

Copy to: Dr P Kennedy, NSIC
R&D Manager



Tetraplegic or Quadriplegic

This is the term used for someone with a Cervical injury which usually results in paralysis of four limbs. Injuries above the level of C4 sometimes require a ventilator for breathing. Injuries below C5 result in shoulder and biceps control and no control over hands and wrists. C6-C7 injuries have wrist control, but still have problems with hands.

Paraplegic

This is the term used for someone with Thoracic injury which usually results in paralysis of two limbs. T1-T8 injuries there is more control of hands but poor trunk control due to lack of abdominal muscle control. T9-T12 injuries have good trunk control due to good abdominal muscle control. L1-L5 and S1-S5 injuries have decreasing control of hip flexors and legs.

SCI injuries also experience other changes i.e., dysfunction of bladder and bowel, sexual function, low blood pressure, control of body temperature, inability to sweat below level of injury.